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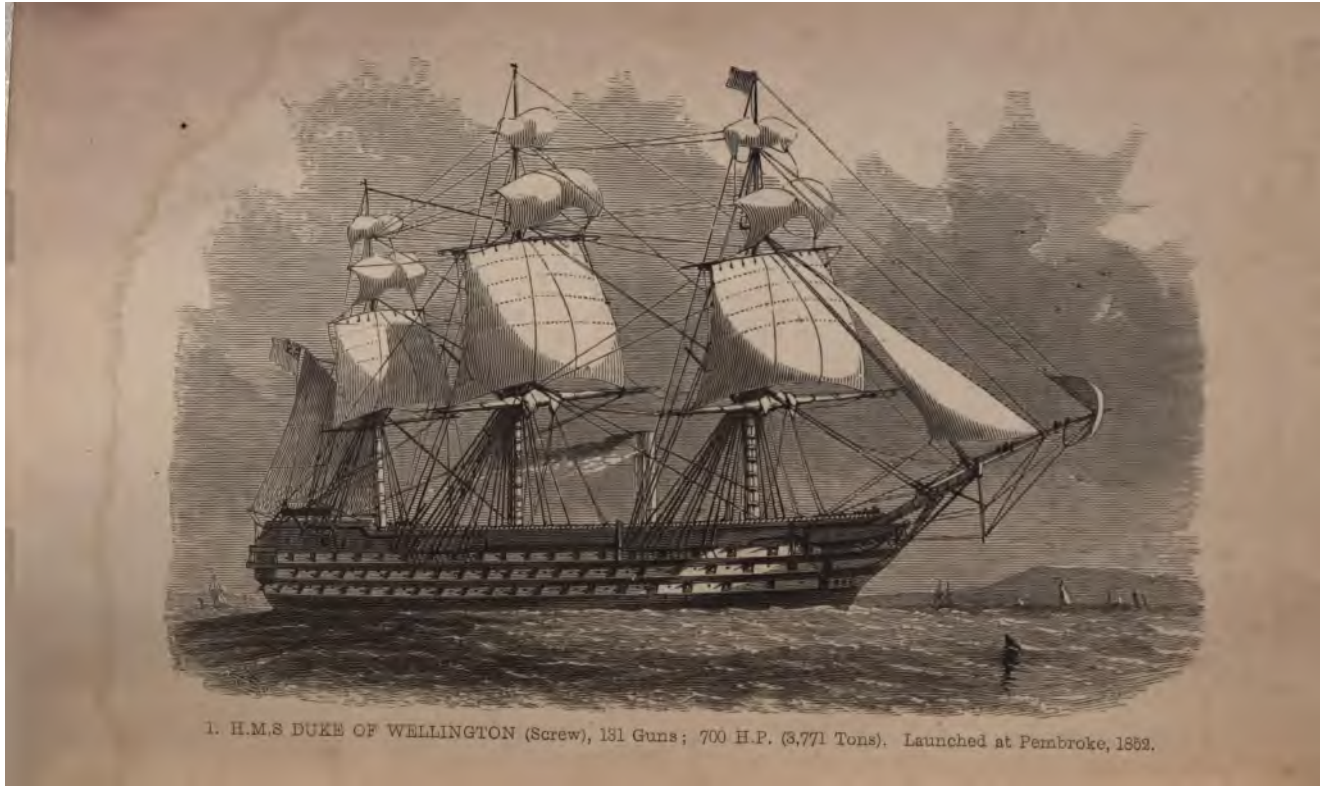

1. H.M.S DUKE OF WELLINGTON (Screw), 131 Guns; 700 H.P. (3,771 Tons). Launched at Pembroke, 1852.

[*The Author reserves the right of Translation.*]

THE

NAVIES OF THE WORLD;

Their Present State,

AND FUTURE CAPABILITIES.

BY

HANS BUSK, M.A.,

OF TRINITY COLLEGE, CAMBRIDGE;

AUTHOR OF "THE RIFLE AND HOW TO USE IT,"

ETC. ETC.

"A miserable shame and dishonour it were for our shipwrights, if they did not exceed all others in the setting up of our Royal ships, the errors of other nations being far more excusable than ours; for the Kings of England have for many years been at the charge to build and furnish a Navy of powerful ships, for their own defence, and for war only."

SIR WALTER RALEIGH.

With Illustrations.

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TO

RICHARD MONCKTON MILNES, ESQ., M.P.

ETC. ETC. ETC.

THIS WORK

Is Inscribed,

IN TOKEN OF THE SINCERE ESTEEM

AND REGARD, ENTERTAINED FOR HIS PERSONAL WORTH

AND GREAT LITERARY ATTAINMENTS,

BY THE AUTHOR.

Her pretensions to take high rank as a maritime Power—Unfounded charge brought against this country of underrating French naval character—Caution of the French in their adoption of the "screw"—The *Napoléon* the first screw-ship of the line—Rapid increase of the French Navy of late—Comparative armaments of English and French ships—Relative proficiency in seamanship and gunnery—*Matériel* of the two Navies—Alleged superiority of the English ships in solidity and durability, as well as in armament—Great efforts of English governments to maintain the efficiency of the Navy—Reckless expenditure—Blunders—Gunboats—Naval ordnance—Gunnery—System of manning the two Navies—Available resources of France—Quality of French seamen—The Prince de Joinville—His organization of the Navy—French officers—Their acquirements and social position—Unfair disparagement of English officers—But their energy, resolution, and endurance admitted—Discipline of the two Navies—Resources of England for manning her Navy—Difficulty of procuring men—Apparent objects of the German critic—Contingency of an invasion—Relative importance to England and France of their Navies . . . . . pp. 11—48

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THE

NAVIES OF THE WORLD.

CHAPTER I.

INTRODUCTION.

Altered tone of our relations with France—Sensation caused by the extraordinary naval preparations at the French ports, increased by the appearance of the famous Leipsic article on the English and French Navies—Growing opinion on the Continent of our diminished Naval power—Uneasiness felt in England from the difficulty of obtaining accurate information—Laudable efforts of the press neutralized by the circulation of erroneous statements—Reasons that prompted the author to seek for information at the fountain head—Visits all the French arsenals—His unexpected success in procuring information—Scope and plan of the present work.

It is matter of notoriety, that the public mind in this country has been considerably disturbed for more than a year past, in consequence of the altered tone of our political relations with the Emperor of France, our "faithful ally;" and that feeling has certainly not been allayed by the secret league into which it is generally believed he has thought proper to enter with Russia. The indignation and excitement caused by the insolent terms in which Great Britain was pointed at, in the official columns of the "Moniteur," by certain blustering colonels in the French army, shortly after the attempted assassination of Louis Napoleon—followed, as

these menaces were by the scarcely less intemperate demand for "explanations" from our Government on the alleged inefficiency of our laws—had scarcely subsided, when a new cause of alarm, prospective indeed, rather than imminent, sprang up, not only here, but on the Continent generally. It originated in the extraordinary preparations made last summer, to give effect to the opening of the new works at Cherbourg. The extent and triumphal character of the *fêtes* commemorative of the accomplishment of one of the great projects of our inveterate foe, the First Napoleon, to which unusual emphasis was added by the significant language uttered by his nephew on the occasion, could not be regarded, on this side of the Channel, but as an intimation that we must for the future be upon our guard at least, if not upon our good behaviour.

But the fortifications and dockyard of Cherbourg, although conspicuous among the many undertakings prosecuted by the present ruler of France with such unceasing vigour, for the development of the naval power of that country, are not the only works of the kind upon which anxious care and lavish expenditure have been of late bestowed. Brest, Lorient, Rochefort, Havre, in our vicinity, as well as Toulon and other minor ports in the Mediterranean, have all lately been much strengthened and considerably enlarged,* especially, as it would seem

* Estimates have lately been prepared for placing the following Northern ports at once in a perfect state of defence. 150,000,000f. have been allocated for the defence of the port of Havre, of which 80,000,000f. are to be charged to the budget of the Minister of Marine, and 70,000,000f. provided by the merchants of Havre. 17,000,000f. are to be devoted to the defence of the port of Dunkirk, 7,000,000f. to Dieppe, and 1,800,000f. to Fécamp. Similar works are to be executed at St. Malo, Carentan, Isigny, Caen, Calais, and Boulogne. A port of refuge is also to be constructed between Brest and Cherbourg, while Brest is to be defended by an entirely new system of fortification, and a large sum is being expended at Lorient.

to a close observer, with reference to their serving as starting points for combined aggressive operations on a gigantic scale.

While the Press of every country was teeming with detailed accounts of these formidable works, and speculating upon the dawning regeneration of French naval power, and the relative subsidence of that of England, hitherto the mistress of the seas, a remarkable document appeared, emanating from quite an unexpected source, and which tended to confirm the new views that, whether well or ill founded, have unquestionably been growing up abroad. An article, entitled the "NAVIES OF ENGLAND AND FRANCE," printed a few months since in a Leipsic periodical, well-known throughout the Continent as the "Conversations Lexicon," was industriously copied and commented upon by the principal journals of Europe. This elaborate essay, a special translation of which has been thought worthy of insertion in the Appendix of the present work, is important enough to be the subject of careful examination, and an analytical review of its main statements and arguments will form our opening chapter. It displays, with many errors of fact and reasoning, considerable acquaintance with the subject, and although it may be considered to betray, if not a decidedly French bias, something very like a disparaging spirit towards ourselves, it would, nevertheless, be unwise if we did not profit by such information as it affords, and weigh well the arguments of the writer; preparing, while there is yet time, to guard against such dangers and humiliations as he more than hints, are in store for us.

It is an opinion, all but universal abroad, that the introduction of steam, as an element in the construction of

ships of war, has rendered superiority in seamanship of comparatively little importance in the execution of naval evolutions.

It is argued that, under the altered circumstances, we shall in future warfare be met on more equal terms, and that, consequently, if we do not preserve an absolute numerical superiority in ships and men, we must be content to forego our title to supremacy, and even run the risk of being exposed to invasion by a well-concerted surprise. Such being the general opinion elsewhere, it remains to be seen what are our convictions at home on a subject of such extreme importance. Not such, we fear, as to remove all reasonable grounds for apprehension.

Inquiries, as is well known, are made occasionally in Parliament; but these seldom elicit any definite results, or serve to infuse confidence into the public mind. There seems, in our system of naval administration, to be a want of ready intelligence, as well as of that unity that imparts such vigour and completeness to the proceedings connected with the marine administration of our neighbours. There is little or no direct personal responsibility apparent in the working of the somewhat antiquated and cumbersome machinery of the Admiralty; and this inherent defect is rendered still more palpable whenever changes of Ministry occur. The consequence is, that the work is for the most part done vicariously, and when any important information is required on an emergency, it has generally to be obtained in a circuitous manner. To whom, then, are the public to look for the facts requisite to satisfy them upon so vital a question? The answer is, chiefly to themselves, through the medium of the Press.

It is to our individual activity, zeal, and perseverance that we are indebted for most of the advantages we enjoy

in this country; and, if we wish to know "how we are governed," or how we are protected, we must needs acquire the knowledge ourselves.

The debt that the country owes to the public Press, for its indefatigable efforts to obtain information, is vast. It outstrips the Government in the appreciation of most matters of national importance, and at critical periods has signally taken the lead in prompt and well-planned action when the authorities have broken down; as many a Crimean veteran can testify, whose sufferings were mitigated by the ready succour he derived from the "*Times* fund."

But to expect the public Press to enlighten us on every point, would be to tax its endeavours too severely. There are some things which it cannot always achieve, and one of these is, the acquisition of detailed and accurate information as to the precise state of the Navies of foreign countries, as well as of the French ports and arsenals in particular, access to several of these not being very readily procurable by foreigners under the existing *régime*. As instances of the errors that may ensue from the reproduction of statements, in the first instance devoid of authenticity, may be here cited, not only many very imperfect accounts of the French Navy, recently given from time to time in various English journals, but more especially one, longer and more elaborate than usual, copied not long since from an American paper, which professed to furnish an accurate list of the chief Navies of the world. It re-appeared without qualification, or any attempt at correction, in several English periodicals, being probably accepted as a semi-official document. Yet its omissions and mis-statements were most glaring. For example, in this list, one Navy comprising 12 line-of-battle ships and 14 frigates and corvettes; and that

of another Power, consisting of 150 vessels and 450 guns, one, by the way, of the best appointed in Europe, were altogether omitted; while in those, whereof perfect lists were professedly given, there are gross mistakes discernible not only in the numbers of line-of-battle ships and frigates, but also in the guns they respectively carry. In one case—that of Spain—we find 6 sailing ships of the line set down instead of 2; 2 steam frigates, of 20 to 54 guns, instead of 3 of 37 to 50 guns, and 3 of 16 guns, while no allusion is made to two others, large and powerful frigates, fast approaching completion. Again, to Holland are assigned 10 line-of-battle ships (the correct number being just half!) and 3 steam frigates, 20 to 54 guns, instead of 3 of 45 to 54, besides numerous other instances of carelessness not worth specifying. Possibly the catalogue of American ships may be more trustworthy; that of the European Powers is for the most comparatively worthless. It may be here mentioned, too, that even the lists supplied at the end of Sir Howard Douglas' valuable work on "Naval Tactics under Steam," are not brought down sufficiently near to the present time.

An earnest desire to obtain authentic intelligence on these matters stimulated the author, during the latter part of the past year, to visit the several French naval stations, at some of which he encountered a variety of obstacles, although he finally succeeded in his object, beyond his most sanguine expectations.

In the prosecution of his inquiries, the writer travelled several thousand miles in France, associated and conversed with people of various grades and professions, as well at the military and naval stations, arsenals, and seaports, as in the large cities and manufacturing towns, and in the rural districts; with officers of both services, landed

proprietors, merchants, lawyers, and also with peasants and artisans, sailors and fishermen. He had thus the best opportunities of acquiring information, and of learning the feelings entertained towards this country by a great number of Frenchmen. Although he cannot but admit that he experienced on no occasion any lack of personal courtesy, it must still be allowed that, if some of the opinions he heard, were reproduced at home, in the precise terms in which they were originally expressed, our national vanity would scarcely feel flattered by the sentiments towards us, so frankly avowed.

With the view, moreover, of fully ascertaining the real capabilities and present condition of the Navy and arsenals of France, he passed some time at Toulon, at Rochefort, at Lorient, at Brest, and at Cherbourg, carefully investigating all that had been done of late years at those several ports, inspecting the works in progress at each. He was, besides, fortunate enough to obtain access to important and unpublished official documents, so as to check the accuracy of oral information. By this means he was enabled to ascertain precisely the present strength of the French Marine, the age of every ship, the port at which she was built, the number of her guns, and in the case of steamers, the horse-power of each.

This information, collected as it is from trustworthy sources, cannot but be deemed, at the present juncture, of considerable value; and if the jealous care of the French Government, in withholding such knowledge, be taken into account, and consequently the extreme difficulty of procuring statistical facts of the kind, in a country where not only no official Navy List is published, but where no catalogue of the sort is allowed to be publicly circulated

under any pretence, some estimate may be formed of the toil necessary to succeed in an enterprise apparently so hopeless as the one undertaken by the author. Patient perseverance, however, overcame all difficulties, and the result of his labours will be found incorporated in the following pages.

The summary there furnished* will certainly afford matter for reflection. That very numerous class of our countrymen who have been accustomed, from the many disastrous defeats sustained at sea by France, during former wars, to regard her maritime resources as immeasurably inferior to our own, will learn with some astonishment that, chiefly owing to the energetic exercise of one indomitable will, she has been for some time past steadily gathering together her giant strength, and could at a very brief notice, if need were, equip for sea a fleet of more than four hundred vessels, of which nearly threescore would be ships of the line! At the same time, the whole available strength of England's bulwarks, numerically reckoned, cannot be considered very materially to exceed that of France; and this is especially the case as regards effective line-of-battle ships and frigates.

One of the author's chief objects, also, has been to collect authentic information on the present condition and the future prospects of our own Navy; in detailing which in its proper place, he has ventured briefly to introduce such views and suggestions for its improvement as may have occurred to himself, or have been derived from a careful examination of the opinions expressed by experienced naval men and other competent authorities.

A slight sketch of the actual state of the Navies of

* Appendix, p. 59.

other maritime powers—as Russia, the United States, Holland, Austria, Denmark, Sweden, &c.—has also been appended, so as to present in a compact form a comparative view of the existing "Navies of the World."

Besides the above topics, the author has thought it essential to a full elucidation of the subject to devote separate chapters to the consideration of other matters intimately connected with the whole question; such as the application of steam to ships of war, and especially the important introduction of the screw; naval gunnery, as based upon the vastly improved ordnance now in use, as well as the altered character of naval evolutions rendered necessary by these changes. He has, moreover, felt called upon to express his opinions upon the apparent inefficiency of the old Admiralty Board in coping with the urgent requirements of the present critical juncture. And, though last, not least in importance, our coast and land defences will be found discussed, if not with adequate ability, at least in a sincere and earnest spirit. In connexion with this latter topic, the author has ventured to call public attention to the great advantage of training a portion of the civilian population to the use of arms, through the medium of Volunteer associations, organized under the sanction of Government, so as to be available on an emergency as a valuable reserve.

The author takes this opportunity of returning his acknowledgments to the representatives of those Powers who have kindly favoured him with correct lists of their several Navies; and to those private friends who have taken a warm interest in his undertaking, and have assisted him with many valuable suggestions. He trusts that his endeavours, so aided, to collect a mass of so much varied information on a question of such national

importance will not be regarded on the whole as unsuccessful. But if his labours, notwithstanding his efforts to ensure accuracy, should be found to exhibit some shortcomings or errors, he solicits that such corrections as will enable him to remedy the defects in a future edition may be forwarded to his publishers.

Should he be fortunate enough to convey to the minds of his readers a correct impression of the present condition of other naval powers, as contrasted with our own, as also a timely warning of the possibility of our becoming involved, at no distant period, in the gigantic struggle now impending between two at least of the greatest Powers of Europe,—his labour will not have been undertaken in vain.

CHAPTER II.

ANALYSIS OF THE LEIPSIC ARTICLE.

Its statements generally vague, and unsubstantiated—Its historical inaccuracy—Growth of the naval power of England—Necessity for her supremacy at sea—Improvements on the part of France—Her pretensions to take high rank as a maritime Power—Unfounded charge brought against this country of underrating French naval character—Caution of the French in their adoption of the "screw"—The "Napoléon" the first screw-ship of the line—Rapid increase of the French Navy of late—Comparative armaments of English and French ships—Relative proficiency in seamanship and gunnery—*Matériel* of the two Navies—Alleged superiority of the English ships in solidity and durability, as well as in armament—Great efforts of English governments to maintain the efficiency of the Navy—Reckless expenditure—Blunders—Gunboats—Naval ordnance—Gunnery—System of manning the two Navies—Available resources of France—Quality of French seamen—The Prince de Joinville—His organization of the Navy—French officers—Their acquirements and social position—Unfair disparagement of English officers—But their energy, resolution, and endurance admitted—Discipline of the two Navies—Resources of England for manning her Navy—Difficulty of procuring men—Apparent objects of the German critic—Contingency of an invasion—Relative importance to England and France of their Navies.

THE remarkable article on the comparative naval resources of France and England, which appeared at Leipsic, in the "Conversations-Lexicon," in the autumn of 1858, has undoubtedly produced a great sensation throughout Europe, from the intimate knowledge of the subject which it seems on the surface to display, no less

than from the startling conclusion it deduces—that England's naval power is so far on the wane, that in all probability she will shortly cease to be mistress of the ocean.

Whether the German critic may be right or wrong in advocating such an opinion, it is unquestionably a matter of no little importance that we should know precisely, in what sort of estimation we are now held by foreign nations with respect to our capacity for maintaining our vaunted superiority at sea; and it behoves us to look fearlessly to such causes as, in the opinion of an observer claiming to be well-informed and disinterested, may lead even to a partial surrender, to any other Power whatever, of that supremacy, in the retention of which, our very national existence is involved.

Rivals we undoubtedly have, jealous of our triumphs in war, as of our equally great achievements in colonization and commerce; rivals who are determined, no matter what may be for the time their form of government or political position, to prepare to dispute with us, sooner or later, a sovereignty so much coveted by themselves. Meanwhile, it may form part of their policy to promulgate an opinion throughout Europe, that our maritime power is in a state of decadence, and that our former proud position in the scale of nations is no longer tenable. To allow such disparaging statements—especially when ingeniously concocted with a plausible parade of intimate acquaintance with the subject, in its various details—to go forth unchallenged, would be really to let judgment go by default, and thus allow our adversaries to gain that part of their object. Is it not rather incumbent on us to meet such statements by a candid

inquiry into their truth, that we may be able, not only to counteract the mischief sought to be done us, by exposing misrepresentation, if it be found to exist, but that we may profit by the useful hints and warnings to be gleaned during the examination?

The author of this work has been induced, mainly on these grounds, to give, not only a translation *in extenso* of the article in question, in the Appendix; but, in commencing his own labours, he has found it advisable to elucidate, in the form of a review, the German writer's more important statements and reasonings. A further motive has also urged the adoption of this course—founded upon the involved and discursive manner in which the original is written, necessitating, for their better comprehension, a re-arrangement of some of its principal topics.

In spite of the bias of the writer, manifested in his foregone conclusions, and notwithstanding his frequent errors and loose assertions—for he rarely quotes authorities—his essay will be found to contain much that deserves our serious consideration, much that may serve to open our eyes to weak points in our whole system of naval administration. Perhaps it may do another kind of good, although an unpalatable one. It may serve to diminish that blind reliance we are too prone to place on our former prowess, especially on our peculiar aptitude for seamanship, and our assumed pre-eminence in naval warfare, regarding them as sufficient guarantees for our success and safety in any future war.

The writer of the Leipsic essay prefaces his observations by a rapid summary of the history of the Navies of France and England, from an early period to the days of Aboukir and Trafalgar; which memorable events,

according to him, led to such feeling of exultation on our part, that Englishmen have ever since regarded with supercilious contempt the efforts of France to raise her maritime character, and consequently "entertained not the most distant idea that she would ever seriously attempt to compete with the naval power of Britain, until the late war with Russia opened their eyes to the true state of affairs."

German writers are not generally apt to err in statements of historical facts. The critic in question, however, in the summary alluded to, is guilty of great inaccuracy in stating that the Navy under Louis XIV. was in a prosperous condition, that it dwindled under his successor, and revived under Louis XVI. He seems altogether to have forgotten that the long reign of Louis XIV. closed in defeat and distress; that his fleet suffered more than one reverse; and that, in the memorable conflict near La Hogue, in May, 1692, Admiral Tourville was utterly vanquished, losing one-and-twenty ships, while the remainder of his squadron escaped with great difficulty. The Marine of the French monarch was long in rallying from the effects of this disaster; while his finances, crippled in a variety of ways, never admitted of his reinstating it upon its former footing.

The pasquinade circulating about the time of his marriage with Madame de Maintenon—

"Dans ses coffres pas un doublon,
Il est si pauvre en ménage,
Qu'on dit que la veuve Scarron
A fait un mauvais mariage,"—

shows the general opinion of his want of resources.

The peaceful days of the Regency, and of the Ministry of Cardinal Fleury, somewhat revived the financial con-

dition of the country, and enabled the government ere long, to construct a new and by no means despicable fleet, as England found out in the succeeding war.

In adverting to the growth of British naval power, and of the conviction, on the national mind, that a preponderating Navy was essential to enable this country to maintain the character and pretensions of a first-rate Power, the writer points out that in its gigantic strides, it has "simply kept pace with the absolute requirements of the people, from whom it originally sprang; and thus the maritime power of the country became identified with them, step by step, in their national growth; while in France its promotion has been, in some sense, independent of the people, and has rather depended on the projects and caprices of individual monarchs."

Alive to this conviction, England has for a long period steadily maintained an array of ships greater than that of any other country; and if now and then, from mistaken parsimony or other causes, she has allowed her armaments to sink below the proper standard, any temporary ill consequences resulting from such an untoward occurrence have been speedily detected and as quickly repaired.

But the assumption of the German writer that, from long-cherished confidence in our pristine superiority, we had been blind to the growing efficiency of our neighbours in naval affairs, until the veil was suddenly removed from our eyes by the formidable display of French power in the Baltic and the Black Sea in 1854, is really too extravagant to need serious refutation on our part.

It will be sufficient to point out what has been palpable enough to most professional men—to every one, indeed, qualified to judge upon the subject—that, from the experience we have had of the quality of French ships and

may be said to have formed the basis of the present maritime influence of France. In his endeavours to effect this, he did what no ruler of France had ever before achieved, he rendered the Navy popular; and thereby did more for it than in any other way.

* * * * *

"The course of policy traced out by him has been wisely pursued by Louis Napoleon; and his subjects can now look with pride and satisfaction upon the work which, fostered and fulfilled by his genius, has secured to France the imposing position she now maintains in the scale of nations. To Napoleon III. is due the merit of having provided materials for the purpose, and of having promoted the object in view with indomitable energy. But it should not be forgotten, that it was the Prince de Joinville and his preceptor, Admiral Lalande, who first moulded anew the Marine of France, giving it stability and establishing its present staff.

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"De Joinville's knowledge was no less practical than scientific. His attention was particularly directed to the construction of the ships. Every improvement suggested in his department was certain to receive candid consideration, and to be adopted, if its merits stood the test of careful scrutiny. His chief care was to improve the build of steamships, and under his auspices some real masterpieces of naval architecture were produced, which not only equalled those of England in every respect, but in some particulars surpassed them. All this was accomplished at far less cost than it would have occasioned in England, because a systematic mode of procedure operated as a salutary restraint, while British failures served as a warning to avoid the repetition of similar errors, even if it did not turn them to account."

We are next told that the French Government, profiting by the costly and extravagant experiments of the English Admiralty, immediately following the invention of the "screw," cautiously bided their time, until a long series of preliminary trials had been made, and the question was sufficiently advanced; then, their "constructors, more scientific than those of England," having perfectly matured their plans, set vigorously to work and eagerly adopted this important invention; the *Napoléon*, the

first line-of-battle ship ever turned out with a screw propeller, having been built by them and launched in May, 1850. The marvellous improvements of all kinds made by our neighbours since that epoch are pointed out as contrasting with what is stigmatized as our own tardy progression; for during the period intervening between 1850 and 1858 the Emperor has built no less than twenty new ships of the line, twenty frigates of the first class, besides forty or fifty of lower rates, in addition to corvettes, small craft, floating batteries, and iron transports, each calculated to carry 1000 troops, every vessel of this vast fleet being fitted with the screw.

That this statement is no exaggeration, the important and perfectly reliable summary of the present naval power of France which the author is now fortunately enabled to furnish in the Appendix,* undeniably shows.

"From all these facts we may well infer," writes the critic, "that, with reference to the number and quality of ships at least, England has good reason to watch with an anxious eye the significant development of strength on the part of her neighbours across the Channel; for though it may not surpass all she has ever exhibited during any previous epoch of her history, she has never before gathered up her power in a manner so systematic, so sustained, or so successful as that she now displays."

When treating of the comparative armaments of English and French ships, the German writer endeavours to show that the old superiority of the fire of the English was mainly attributable to the greater number and weight of the guns they mounted (in proportion to their rates) than their adversaries carried, clenching his argument by reference to two isolated cases, and then complacently proceeds to sum up thus:—

"From this disparity in the number and calibre of their guns, as

* Appendix, p. 59.

well as in the mode in which they were served, it resulted that France and her allies lost 85 ships of the line and 180 frigates, while their antagonist only suffered to the extent of 13 ships of the line and 83 frigates."

The best commentary that can be made upon this off-hand assertion, is to quote, from James's "Naval History," the following statement of the comparative *actual* force, in weight of metal, of the English and French line-of-battle ships, at the commencement of the war in 1793:—

	Guns.	lbs.
British ships of the line, 115	... 8718 ...	weight of metal, 88,957
French „ „ 76	... 6002 ...	„ „ 73,957

This disproportion, so much in favour of French ships, James proceeds to tell us is "chiefly attributable to all their lower-deck guns having been of greater nominal calibre, by one-ninth, than the heaviest long gun carried by any British ship; and as a French gun of any given calibre is of greater power by one-twelfth than an English gun of the same nominal calibre, the mere number of guns on each side is still an inadequate criterion of force.* It is this mode of comparison alone that can enable posterity duly to appreciate the efforts of the British Navy in the two eventful wars which grew out of the French Revolution; at the outset of which so efficient was the maritime power of the French, in their own opinion, that Jean Bon Saint André asserted without contradiction, '*Avant la prise de Toulon, la France était la puissance maritime la plus redoutable de l'Europe.*'"

Further on, the critic changes his position, and partly attributes our successes to the custom adopted by our sailors of firing almost exclusively at the hulls, and thereby doing more execution than their opponents, who aimed chiefly at the masts and rigging. From the

* See the table at the end of Chapter VIII.

untenable position he had attempted to take as to our alleged advantages in the number and weight of our guns, he passes rapidly to make some very pertinent remarks on one of the true causes of the superiority of British seamen over French crews in naval warfare—that is, from their nautical skill being usefully combined with great proficiency in gunnery; the duty of working the guns on board French ships having previously devolved upon artillerymen or soldiers, who of course had nothing to do with the working of the ship.

"Other nations clung long to the old system; and the French, not without some disadvantage to themselves, were the last to abandon it. So lately as the year 1822 they still retained to its fullest extent the system of a divided command, and every ship carried two distinct classes of troops—seamen and artillerymen—neither of whom possessed any knowledge of the duties of the other. Each *corps* had its own separate constitution, and was, so to speak, inspired by a different spirit. Each followed its peculiar form of discipline, and obeyed only its immediate officers. Each was jealous of any interference in its special work, or of any infringement of its traditional prerogatives. But in 1822 a change at last crept in. It could no longer be denied that the Navy could never effect what was required of it, unless there was but one description of force in a fleet, and that force composed wholly of practical seamen—and unless the officers who worked the ship had the sole command of those who served on board of her. This conviction abolished at once the military element on board ship, and soon gave rise to the creation of a *corps des équipages de ligne*, intended to manœuvre alike both the guns and sails, and to be trained as well to the use of small arms. We shall have occasion by-and-by to recur to this latter provision; it will suffice here to remark that the new system, being based on the idea of producing a sort of universal capacity, created some difficulties in the way of its own practical working. After eleven years' experience it was found necessary to modify it considerably; a circumstance which, while it did not exactly impair the unity of the *équipages de ligne*, created, nevertheless, a subdivision of the same, called *matelots canonniers* (seamen gunners), whose exclusive duty was to serve the guns.

"The special object in training these naval gunners is to qualify

them afterwards to act as captains of guns on board ships, to superintend the service of the laboratory, and to form a body from which the non-commissioned artillery officers and the general crews of men-of-war could in emergencies be recruited."

We may now proceed to review that portion of the essay before us, in which a comparison is instituted between the *matériel* of the British and French Navies from the close of the great war in 1815 down to the present time.

While England, according to the Leipsic writer, in 1815 had 177* ships of the line and 238 frigates, there remained to France of those two classes of men-of-war but 69; and in 1820 these were further reduced to 48, while thirteen years later they had actually dwindled to 33, the lowest point ever reached. The aspect of affairs in the East gave a stimulus to exertion, and led to a re-organization of the French Marine, so that in the spring of 1840 the French effective ships of the line amounted to twenty-two; there are consequently, as this writer correctly remarks, and as has been already observed, few French ships of the line that date back earlier than that year.

He then points, by way of contrast to the foregoing picture, to the present state of affairs, as a proof, humiliating enough to our national pride, of the large results obtained by France from pursuing a more vigorous and well-sustained yet economical system of naval management, and by which she has at length risen to a level, in his opinion, as high, if not higher, than our own in naval power.

* This is a misstatement throughout. In 1815 England had 218 ships of the line and 309 frigates; France 69 ships of the line, and 38 frigates; England had, besides, 261 sloops and brigs, or a grand total of 788 ships. In 1820 France had 58 ships of the line and 39 frigates (total 97, instead of 48, as above stated); and in 1840 she had 44 ships of the line and 56 frigates, besides 89 sloops and brigs; total, 189.

"We find by the official 'Navy List' of 1857, that England had 546 ships of war of all denominations, besides 162 steam gunboats; and France only 450 men-of-war, and 30 steam gunboats. The number of ships of the line upon which the decision of the more important class of engagements mainly depends is in these accounts placed at 78, and that of France at 63. The proportion of screws and sailing vessels seems to be pretty nearly equal. It appears, then, that France has 15 sail of the line, 100 smaller vessels, 60 gun vessels, and 130 steam gunboats less than England.

"If we carried our investigation no further than this, we should naturally conclude that, with such a numerical superiority, sufficient in itself to form a very respectable armament for a second-rate power, England has little to fear from the Marine of France. We must not forget, however, that quality as well as numbers must be considered in estimating the strength of a fleet. When we take this element into our calculation, we shall find the balance very soon turned in favour of France. We perceive, then, that while the English list comprises every individual sail the country possesses, whether fit for commission or altogether antiquated and past service (and some, like the *Victory*, built towards the close of the last or the beginning of this century), the French Navy, as we have above observed, scarcely contains a single ship built prior to the year 1840; so that nearly all are less than twenty years old. This is a fact of the greatest importance, and indicates an immense preponderance in favour of France.

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"By the introduction of the screw, such fundamental changes have been introduced, within the last fifty years, both into the principles of naval architecture and of gunnery, that a modern 120-gun ship, built with due regard to recent improvements, and carrying guns of the calibre now in ordinary use, would in a very short space of time put *ten* ships like the *Victory hors de combat*, with, at the same time, little chance of injury to herself. If, therefore, we assume the number of antiquated British ships of the line at 20 only, the frigates past service at 40, the smaller craft at present worthless at 60, in which assumptions we are certainly within the mark—while those of the same quality in the French list cannot be taken at more than ten line-of-battle ships and 20 frigates and corvettes, since in 1833 her whole complement was but 33—we shall have brought the numbers of the two countries to about the right level."

To any one with sufficient knowledge to qualify him

to judge on these matters, it must be obvious that any attempt to found an argument upon statements so loose, must necessarily be valueless. The vessels enumerated are very indifferently classified, and the whole summary is inaccurate, involved, and confused.

No distinction is drawn, either, between sailing ships and steam vessels, nor between screw and paddle-steamers; it is therefore tolerably evident the writer either did not clearly understand the proper classification, or, what is more probable, has been tempted to foist in a foregone conclusion, intended to create an impression not warranted by the actual circumstances.

In dealing with the respective qualities of construction of the two Navies, he thinks proper to assert, that up to a late period English ships of war were generally far superior to those of France, both in solidity and durability; and upon this hypothesis, unsupported by any attempt at proof, joined to that we have already demolished of our superior armament, he maintains that the ill success of the French at sea, after the outbreak of the first revolutionary war, was mainly attributable. "The great destruction of their ships in past wars," he says, "having arisen from their being so slightly built, badly fitted, and worse appointed." A more erroneous notion could hardly have been adopted. It is a notorious fact, that many of the very best ships, and undoubtedly the fastest sailers, in the British Navy, at the period he refers to, were vessels captured from the French by Rodney, Howe, and other celebrated commanders; and these very prizes, together with others taken from the Spaniards, not only served as models of construction in our dockyards—a fact elsewhere admitted by the Leipsic critic—but were for many years in active commission in our Navy.

Sir Charles Napier, no mean authority on such a point, expressly remarks that "there was not any deficiency on the part of the French ships, either in strength or weight of metal; for they were in general as well built as our own, and superiorly armed, and many of them were retained in our service, and copied by us."

In corroboration of this assertion, and as the most complete refutation of the reviewer's misstatement, it may be mentioned here, that the *Belleisle*, 74, captured from the French in 1795 (and then called the *Formidable*), bore a considerable part in the battle of Trafalgar, where she lost thirty-three of her crew killed, and ninety-three wounded, and was herself very severely handled; subsequently she saw a good deal of service, and was only broken up in 1814, nineteen years after her capture.

The *Franklin*, 80, taken at the Nile in 1798 (and called by the English *Canopus*), was, for a long time without a rival, justly deemed the finest two-decker in our Navy, serving for many years as a model for the 84-gun ships then built. She was constantly employed, and at St. Domingo actually fought a French three-decker of 130 guns. She was in commission in the Mediterranean squadron, forty years after her capture.

The *Donegal*, 74 (in the French Navy called the *Hoche*, and also captured in 1798), was engaged in the battle of St. Domingo. She was actually in commission for forty-seven years in the English service.

The *Généreux*, 74, captured in 1800, was sixteen years in the English navy list.

The *Genoa*, 74 (French name, *Brillant*), taken at Genoa, 1814, fought at Navarino in 1827, where her captain was killed; and was only broken up in 1838,

after having been employed by her captors twenty-four years.

The *Impétueux*, 74 (previously called the *Amérique*), captured in 1794, was only taken to pieces in 1813.

The *Implacable*, 74, captured (under the name of *Duguay Trouin*) in 1805, since which time she has seen much hard service, and particularly on the coast of Syria, in 1840; is still, after the lapse of fifty-two years, in the navy list.

The *Malta*, 84, captured in 1800 (then *Guillaume Tell*), was in the English service for forty years.

The *Pompée*, 80, taken in 1793, in addition to many other services rendered by her, captured a French 74, and was in existence twenty-three years from the time she was brought away from Toulon by Lord Hood.

The *Sans Pareil*, 80, captured on the 1st of June, 1794, appeared in Lord Bridport's action a few weeks afterwards, as the flag-ship of Rear-Admiral Seymour, and discharged for many years the ignobler duties of a sheer hulk.

The *Scipion*, 74, captured in 1805, after having been long actively employed, was broken up in 1819.

The *Spartiarte*, 80, captured at the Nile in 1798, did her captors good service in various ways for more than half a century.

The *Tigre*, 74, taken in 1795, was at Acre under Sir Sidney Smith, and lasted many years after that.

The *Tonnant*, 84, taken in 1798, fought hard at Trafalgar, and only ended her days in 1821, having thus served us for twenty-three years.

The *Africaine*, 44, captured in 1801, was continually in commission; had a desperate encounter in 1810 with two French frigates, when, after an engagement of nearly three hours, having out of a crew of 295 lost 49 killed,

and 149 wounded, she struck, but was recaptured the next day, and remained on the English navy list for six years after.

The *Alceste*, 36, taken in 1806 (then entitled *Minèrve*), fought in the well-known action of Lissa, saw a great deal of service, and was wrecked in the China seas in 1817.

The *Amelia*, 42 (captured under the name of the *Proserpine* in 1796), served twenty years in the English Navy, and was often under fire.

The *Belle Poule*, 40, captured in 1806, an old vessel then, lasted ten years longer.

The *Desirée*, 40, captured in 1799, was not off the navy list till thirty-three years after that date.

The *Egyptienne*, 44, captured in 1801, lasted sixteen years.

The *Fisgard*, 40 (French *Résistance*), taken in 1797, herself captured the French frigate *Immortalité* in 1798, was in many other actions besides, and was sold out of the service in 1814.

The *Loire*, 46, captured in 1798, was for eighteen years a British man-of-war.

The *Révolutionnaire*, 38, taken in 1794, saw some hard service during a period of twenty-eight years.

The *San Fiorenzo*, 36 (in the French Navy, *Minèrve*), taken in 1797, captured, with the aid of the *Nymphe*, two French frigates in 1805, took the *Sylphe* in 1805, and in 1808 the *Piedmontaise* (a frigate very much her superior). She remained upwards of fifty years in the English service.

The *Seine*, 36, taken in 1798, captured the French *Vengeance*, of much greater force, and was wrecked in 1803.

The *Sybille*, 36, captured in 1794, took in 1799 the *Forte*, a much more heavily-armed ship than herself.

The *Unité*, 32, captured in 1793 (then named *Impérieuse*), is still a convict hulk.

The *Virginie*, captured in 1796, in May, 1808, fought and took the Dutch frigate *Guelderland*, and was sold in 1822.

The above catalogue, which might be considerably extended, incontrovertibly refutes the assertion that the weakness or incapacity for resistance of the French ships was in any way the cause of English triumphs. It has been seen that numerous prizes, several of them old ships, rendered good and important services to their new masters, and frequently contributed, either singly or collectively, to swell the long array of British trophies in many a long and well-contested action.

In allusion to this topic, Sir Charles Napier plainly states that it is a complete mistake to imagine that our successful actions were gained either by our having tougher ships or heavier artillery. "We were," he states, "generally opposed to larger ships and heavier metal. It was our experience at sea, our rapid fire, and the superiority of our aim, that gave us the victory. The French have now found out their mistake, and are doing all they can to give their officers and men experience; while, with the exception of gunnery, we seem to be doing all we can to lose our seamanship and experience."

Our German critic, having however fully made up his mind that our ships were more thick-headed and thick-ribbed than those of our enemies, jumps at once to a bold conclusion, and asserts with cool assurance that Nelson's success at Trafalgar is attributable to a rash manœuvre, daringly executed, in contravention of all the received rules of naval tactics, and determined upon solely from his confidence in the stout timbers of his ships, which

could receive, without danger of being sunk, the broadsides of the enemy. But our German friend's illustrations are peculiarly unfortunate.

The *Victory*, after the battle of Trafalgar,* was taken for repair to Chatham; and it so happens that Sir Robert Seppings, in surveying her, noticed particularly that, while bearing down on the enemy, she had suffered very considerably at the commencement of the action on both her upper and main decks, in consequence of the grape-shot even having penetrated her "*thin scantling*," as he officially notified; and in his report he specifically stated, that "it was perfectly evident, if the ship had been formed *with a regularly* and *solidly-built bow*, many a life would have been saved." Captain Hardy fully corroborated this opinion; and it is generally believed that the curved bow now in vogue, timbered and planked as it is, like the rest of the ship, was introduced partly in consequence of the observations made on this particular occasion.

Again, on referring to the remarks made by Mr. James on this important point, in the Introduction to his "Naval History," we find the following:—

"The great fault of British men-of-war, at the close of the seventeenth and the beginning of the eighteenth century, was their insufficient size in reference to the guns they were forced to carry. Hence their lower batteries

* At page 10 of the Appendix, it will be seen that allusion is made to the number of ships captured at Trafalgar. With the usual want of accuracy of this German critic, the number is stated to have been thirteen. In that memorable engagement, the enemy's force consisted of eighteen French and fifteen Spanish ships of the line; the English, of twenty-seven. *Nineteen* vessels were captured, sunk, or destroyed. Some of the prizes, it is true, being dismasted, drove ashore in the storm that succeeded the engagement, and were re-captured; but the above error cannot be affected by that circumstance.

could seldom be used in blowing weather; and they sailed and worked heavily."

In further allusion to the superior size of foreign ships at a subsequent period, Mr. James observes, "The French and Spanish builders had certainly proceeded upon a more enlarged scale of dimensions than the builders of England. The ports are wider also, and further apart than the ports of English ships mounting the same number of guns, affording a greater space for working them, and so raising the line of fire that they can act without risk from a troubled sea; the want of which advantage has often been felt by the old English two and three-deckers. Among other advantages which attend the larger ship may be reckoned her less liability, owing to her increased stoutness, to suffer from an enemy's guns, and the greater precision with which, owing to her increased stability, she can point her own."

In conclusion, Mr. James adds that, "although we have availed ourselves of the progress in modern naval architecture,"—so that, when he wrote, we possessed many ships which, equal in dimensions and form, surpassed in strength and finish those of any other Power;—"yet it must be remembered that those national Navies which, from frequent discomfiture, have been the oftenest renewed, are necessarily the most uniform, while that single Navy which has for ages remained unimpared by defeats, and which appropriated what the others have lost, exhibits the utmost variety in the size of its respective classes. Its reduced scale of complements, ever the well-known characteristic of the British Navy, is owing partly to the contracted size of its ships, and partly to a principle of pure native growth—a reliance upon the physical, rather than upon the numerical, strength of its seamen."

While attributing to the French system of naval management the highest praise for vigorous action combined with a cautious economy, the critic concedes to our Admiralty the merit at least of unbounded liberality in their endeavours to maintain the efficiency of the Navy:—

"The same spirit which impels the people of England, on so many occasions, to a lavish expenditure, exists in full activity in the Admiralty. Every discovery, however problematic, if it only promises any great advantage in that department, is seized upon with avidity, and is put into operation without any consideration either of time, trouble, or expense; nor does the doubtful nature of the results, any more than the weight of public opinion, operate in any way as a restraint.

"When we see such vessels turned out as the *Sovereign*, the *Invérieuse*, the *Euryalus*, we are fain to confess that this mode of procedure sometimes produces very wonderful results. But, at the same time, if we take into consideration the general condition of the fleet, it is manifest that the effects are not commensurate with the prodigious disbursements it occasions. Thus, we cannot hear, without the greatest astonishment, of the enormous sums sunk in experiments which have turned out complete failures. We have already observed, that in 1815 the English complement was 743 seaworthy ships of war, without taking into account either those on the stocks or transport ships, while the present number is only 546, showing a diminution of 200 vessels. The whole outlay for maritime affairs between 1815 and the outbreak of the Crimean war was 160,000,000*l.* sterling.

The two following specimens of reckless expenditure are cited to show the way in which the public money has been squandered by the Admiralty:—

"First, then, we find Admiral Napier calling the attention of the First Lord of the Admiralty to the fact that, since 1815, 13 three-deckers, 144 two-deckers, 21 first-class frigates, 155 second-class, and 50 third-class vessels, besides 334 of inferior denomination (in all 717 craft), had utterly disappeared! And on another occasion, Mr. Hume declared, from his place in the House of Commons, and without contradiction, that, of 308 ships of war built between 1828 and 1843, one-third were found unfit for service. Startling, however, though such assertions are, they are perhaps surpassed by the extravagant

proceedings connected with the building of war-steamers. Though it was as far back as the year 1822 that England first attempted to construct paddle-wheel steam-ships for purposes of war, it was not till 1840 that she succeeded in producing one that answered its object, and her lines were then taken from those of French model. We mean the *Terrible*, in building which the lines of the *Gomer*, brought to England by Louis Philippe, were adopted. Still it is but justice to add, that this tardy production far surpassed her prototypes, though it must also be confessed that no less than eight had been previously turned out, all of which proved utter failures. By the year 1850 England had twenty paddle-steamers, each intended to carry thirty-two guns of heavy calibre; but upon actual trial it appeared that there were but three, the *Terrible*, *Sidon*, and *Odin*, which could carry their guns: all the rest were too crank to bear their *lower*-deck armament, and could but take the six guns on their upper decks. France, on the other hand, had within the same period built twenty-two steam frigates of the same number of guns, every one of which proved perfectly stiff and staunch.

"Then, again, England suddenly took a fancy to build thirty*[?] iron steam men-of-war, and it was not till they had been some time completed that they discovered that iron was ill adapted for ships of war; and this futile experiment cost the nation 3,000,000*l.* sterling. France, in the mean time, never departed from the use of timber."

Some severe comments ensue upon the extravagance and blundering of our naval authorities in their first experiments connected with the introduction of the screw.

It is asserted, too, that the attempts to apply the propeller to sailing ships were egregious failures; contrasted with which alleged clumsy mode of constructing a screw steam Navy, the more cautious but energetic efforts of the French, in building new ships of this description upon the most admirable models, are significantly pointed at.

In estimating the value of this assertion, it should not be forgotten, however, that a country profiting by the example and experience of another which has, under the

* Only 18 were ever completed (*Editor*).

pressure of necessity, entirely revolutionized an obsolete system of naval construction and armament, possesses enormous advantages, which enable her, in initiating a new order of things, to steer clear of the unavoidable errors originally committed by the country whose prorgess she is watching.

The writer, with no other object evidently than to sneer at our reputed failures, next indulges in some rather flippant comments upon the comparative merits of the screw gun-boats and floating batteries built by the two countries to meet the requirements of the war with Russia. It would seem, however, that he was unaware of the well-known fact, that not only were our floating batteries equally efficient with the French, but that they may be regarded as almost identical with them in form and construction, French drawings having been courteously furnished for the purpose, and followed by our builders, with the exception of a peculiar arrangement for steering, which we only adopted on finding our "improvement" upon it to be a failure.

We have already shown the German critic to be ill-informed, and disposed to make random assertions on the subject of ships' guns formerly in use; his knowledge of the vast improvements that have taken place of late years seems equally scanty. Thus he contents himself with the remark that—

"There has been a great improvement in the material of which the guns themselves are constructed. No branch of military science has undergone such radical changes during the last fifty years as ships' guns. The invention of shell guns by General Paixhans has doubled and trebled the calibre formerly in use, so that, while formerly a 32-pounder was the largest, it has now become the very smallest.

"A similar change has taken place in the Navy of every first-class Power. With slight modification therefore, owing chiefly to the

various standards of different countries, we may now regard ships nominally of the same class to be pretty nearly equal in power all over the world."

And he concludes with the mere mention that the guns of the American frigate *Niagara* are of the calibre of 236 pounds.

He then places before his readers a comparative statement of the respective armaments of an English and of a French ship of the same rates, to show that in this respect the two Navies are now nearly upon a par.

"ENGLAND.—*Queen*, line of battle ship, (nominally) 116 guns.

Lower Deck.—Ten shell guns. No. 2 of 8-inch bore (corresponding to 22 centimètres French); eighteen 32-pounders, No. 1 (corresponding to French 30-pounders, No. 1).

Middle Deck.—Four 8-inch shell guns; twenty-four 32-pounders, No. 2.

Main Deck.—Twenty-eight 32-pounders, No. 3.

Quarter Deck and Forecastle.—Each one 8-inch shell gun, No. 1 (95 cwt.); twenty-four 32-pounders, No. 3.

The entire weight of a broadside of fifty-eight solid and hollow shot would amount to 2160 lbs.

"FRANCE.—*Ville de Paris*, line-of-battle ship, (nominally) 120 guns.

Lower Deck.—Four 50 pounders; twenty-two 30-pounders, No. 1, and six shell guns of 30 centimètres, No. 1.

Middle Deck.—Twenty-eight 30-pounders, No. 2; four shell guns of 30 centimètres.

Main Deck.—Thirty 30-pounders, No. 3; four shell guns of 30 centimètres.

Quarter Deck and Forecastle.—Ten shell guns of 22 centimètres, No. 2.

Total weight of broadside, 2120 lbs.

"Thus, the whole difference in a broadside from two ships of this class would only be 40 lbs., and that in favour of England; but the amount is so small that it can occasion no appreciable difference, and is indeed compensated by the superior armament of the large class of frigates."

The inaccuracies in this statement are too obvious to any professional man to require being pointed out in detail.

Before adverting to the important question of equip-

ment, he introduces some further remarks upon the gunnery practice of the two Navies, which are well worthy of attention. In the course of his historical researches he appears to have been much struck with a notable circumstance in our favour, attributable to superiority in gunnery—that is, the "fewer casualties we sustained as compared with other nations with whom we have been engaged," and he brings forward some startling facts to prove this. Our seamen, as he remarks truly enough, not only aimed with greater precision and fired more steadily than their opponents, but they had the reputation of loading with far greater rapidity; and he clenches this statement by the allegation, that in 1805 it had been noted that the English could fire ball at the rate of a round per minute, whereas it took the French gunners thrice as long to perform the same operation.

We now approach the examination of what appears to us the most important part of the essay before us—the writer's remarks on the respective systems adopted by the two countries for manning their Navies. After commenting incidentally on the obsolete system by which the French Navy was manned in the olden time, the change judiciously introduced in 1852 is pointed out with approval, as it abolished the military element that had so long operated to the detriment of the service, and judiciously substituted for it the *corps des équipages de ligne.* In 1833, the corps of *matelots canonniers* (marine artillerymen) was established, and various additional salutary modifications of existing institutions were also adopted. These *matelots canonniers* were, as their name implies, to be specially trained to naval gunnery, and to supply from time to time efficient non-commissioned officers for distribution throughout the fleet—a hint probably taken from

our own training-ships. But this plan, however well devised, was found to possess one very material drawback. The conscription rendered it almost valueless, because, as the men, upon the expiration of their terms of service, returned to their homes, the cost and labour of training them were found to have been, in the majority of instances, thrown away.

The sagacity of the present Emperor devised a remedy for this evil. Among the first great efforts visible at the commencement of his reign, was a determination to augment the number of his ships to an extent never previously thought of, and at the same time to enhance the efficiency of the seaman and ameliorate his condition. Under this new regulation it was stipulated, that every sailor must enter the service for a period of ten years, and that, with the practical knowledge inculcated on board the training-ship, there should be combined a course of theoretical instruction on shore, stimulated by periodical examinations. The French marine artillerymen may therefore now be held to be well grounded in at least the rudimentary principles of the science of projectiles. In this way a body of five hundred picked gunners is annually turned out, at the same time that a supply of efficient "captains of guns" is being formed; nor are any pains spared to improve the quality and power of the guns themselves.

The corps of *équipages de ligne*, formed as it is of the whole body of seamen on the establishment of the Navy, comprises five divisions. One of these is stationed at each of the principal naval ports, Brest, Toulon, Cherbourg, Rochefort, and Lorient. In 1845 the whole number amounted to 36,000; it is said, in 1858, to have increased to 60,000; the *corps de l'artillerie de la marine* is a dis-

tinct subdivision; the men composing it are engaged in the fabrication of ordnance and the preparation of ammunition; it is now 6000 strong. The *matelots canonniers* number 3500, the *infanterie de la marine*, not precisely analogous to English "Marines," comprises 20,000. Then at Lorient there is, in addition, the *gendarmerie maritime* (harbour police), 400. At Brest, Rochefort, and Toulon there are 1600 *gardes chiourmes*, and in the different dock-yards five companies of shipwrights, riggers, and labourers, besides five of *ouvriers pompiers*; and, lastly, the *corps impérial du génie maritime*, furnishing the engineers of the fleet, another 500.

If, to render this statement the more intelligible, we arrange it in a tabular form, it will show a disposable contingent of 92,000 fighting men, available for manning the fleet :—

Equipages de ligne (i.e., organized crews), including 3500 matelots canonniers	60,000
Artillerie de la marine	6,000
Infanterie de la marine	20,000
Gendarmerie maritime (at Lorient)	400
Gardes chiourmes	1,600
Five companies of shipwrights, riggers, and labourers, and five of ouvriers pompiers	3,500
Corps impérial du génie maritime	500
Total	92,000*

In speculating as to what may be reckoned upon from the maritime inscription as a reserve, in addition to the above force of 92,000 men represented as now available, we find the German writer states :—

* This enumeration supposes every man available, but of course a considerable deduction must be made for invalids, absentees, &c.

convicts - galley slaves

The total number of seamen inscribed in 1855 .	162,000
If we deduct the numbers absorbed by the équipages de ligne	60,000
There remain	102,000

for the present use of the merchant service. From these, of course, a large reserve could be drawn in case of the outbreak of war, although only a portion of it could be depended upon as immediately available. The writer, by some mode of computation not explained, estimates this very liberally, we think, at 42,000; but, as he states, according to another hypothesis of his own, that in the equipment of ships of war two-thirds only of the crews are required to be seamen, the remainder consisting of marine artillerymen, marines, &c.—

We should accordingly add to this assumed number of seamen, as supplying two-thirds of the crews	42,000
One-third more of marines, &c., which would of course have to be organized (a work of time) .	20,000
Giving a total reserve of . . .	62,000
These added to the present force above stated of .	92,000
Will present a grand total of . .	154,000

as the estimated gross *personnel* of the French Navy.

Now, as the critic assures us that the whole existing French Navy would only require 130,000 men, it is evident that, supposing his calculations to be trustworthy, France might fairly reckon, even on a sudden recurrence of hostilities, upon being fully prepared without any serious delay, or any very extraordinary effort, to send to sea every ship she possesses, should the occasion require such a display of force. It is only fair to add that, as the number of seamen registered is taken from the list for 1855, a con-

siderable augmentation must be supposed to have taken place since that period, from the development of French commerce and the consequent increase of the mercantile marine. This cannot, at the most moderate computation, be set down at less than ten or twelve thousand men.

As no official authority is quoted in support of the above statistics, the reader must, of course, have faith in the writer's accuracy before he can place any dependence upon them; but there must surely be a material error in his assumption that only two-thirds of the crew, even of a French ship, need be seamen. This proportion, although possibly correct enough in time of peace and for short cruises, would be found hazardous in a state of active warfare. In the British Navy the complement of marines, and marine artillerymen, constitutes about a seventh or an eighth only of a ship's crew.

The critic, commenting upon the quality of the French seamen of the present day, observes—"That it has been too much the custom, especially in England, to speak contemptuously both of French seamanship and French sailors;" and that in doing so we mentally recurred to the men we had beaten in the last great war; but our experience with French fleets in the Crimea must, he alleges, have taught us that their sailors of to-day are no longer the men of 1806; in short, that "*they are in no respect inferior to the English.*" The deficiency in nautical experience, and especially in the manœuvres of squadrons, which France laboured under, has, he adds, "been remedied since 1840, by the maintenance of permanent experimental squadrons, under such admirals as Lalande, De Joinville, Ducas, Hamelin, and Bruat;" which, he is pleased to tell us, "since 1853 have not ceased to humble the boasted

superiority of England, besides causing her many anxious misgivings."

The Prince de Joinville, as he truly states, was the first French naval officer to recognise the great want of practical instruction; a defect he efficiently remedied by permanent squadrons of evolution, wherein officers, as well as men, were thoroughly trained and made practical seamen. Some allusions to the Prince's "Essay on the French Navy" afford the writer an opportunity for passing a high encomium upon the discernment, energy, and abilities of that officer, who so greatly exerted himself to establish a powerful fleet, and to remedy the evils arising from the supineness and neglect of his predecessors.

The strong bias influencing the mind of the critic throughout, comes out in full force in the following passage; the sweeping conclusion to which is so absurd, that it would be little better than an insult to the reader's judgment to attempt to controvert it. No intelligent officer, even in the French Navy, would endorse the preposterous assertion :—

"Any one who had the opportunity of viewing the two fleets together in the Black Sea or the Baltic, and was in a position to draw a comparison, could not fail to be convinced that everything connected with manœuvring, evolutions, and gunnery was beyond comparison more smartly, quickly, and more exactly executed by the French than by the English, and must have observed the brilliant *prestige* which had so long surrounded England's tars pale sensibly beneath the rising glories of her rival."

French officers are described as far superior to those of England in "theoretical culture and intellectual training;" and the Leipsic writer ventures even so far as to add, that some of our subordinate officers would be "puzzled to calculate a right-angled triangle." In France, on the contrary, the students in the *Ecoles Navales* receive an

unexceptionable education, not being admitted to the official examination till they have passed through a course of abstruse study. The science of navigation is, we are told, the great goal of all their exertions, it being required that all nautical calculations should be made with the greatest precision. This, we learn from the same oracular authority, is far from being the case in England, the duty of the "master" of an English vessel being performed by a lieutenant in all French ships. From these and other circumstances, he adds, "it follows as a necessity that the social position of naval officers is much higher in France than in England; while this higher education makes itself felt in the tone of the corps, and procures for them greater respect from their subordinates."

Contrasting our naval officers with those of France, he maintains that, as it is the custom with us to send midshipmen to sea at a very early age, their education in every matter not immediately connected with their professional pursuits is necessarily checked; and, moreover, that when they come to pass their examination, it comprises so limited a range of studies, that a lad of ordinary ability may be crammed for the occasion and pass without difficulty. At the same time it is admitted that, even under our present defective system, efficient officers have arisen, distinguished alike for their professional acquirements, and general mental culture. He might, had he thought proper, have instanced the names of Beechey, Franklin, Parry, Beaufort, Owen, Ross, Keppel, McClure, Chamier, Marryat, Basil Hall, Plunkett, and a host of others who, in our own time, have earned for themselves a very distinguished position in the fields of professional knowledge, literature, and science. But he maintains that the exceptions to the rule owe their pre-eminence

to their own personal exertion, or to their having enjoyed greater advantages than others in their home education, rather than to any benefit they have derived from public institutions; had they indeed, as he affirms, but trusted to what they were there taught, they might have advanced to maturity without necessarily attaining proficiency in the practical requirements of their profession, and might, moreover, be appointed to important commands, without really knowing how to work a ship! This state of things is in a great measure attributed by him to the old custom of employing "masters," who hold a relatively subordinate position as officers, and to whom the navigation of the ship is entrusted. The critic evidently labours under the erroneous supposition that the officers of the English Navy generally, have no knowledge of the science of navigation, in every branch of which, he takes care to impress upon us, the French provide that all their officers shall be thoroughly versed. He goes on to say—

"It is only quite recently that England appears to have discovered that her naval officers cannot dispense with at least some amount of scientific knowledge; and she has, in consequence, founded a naval college, where cadets receive a somewhat higher education than they formerly received. Whether this attempt will be rendered abortive by the inherent aversion of English seamen to theoretical study it is impossible for us to divine. The future will decide."

When touching upon national characteristics, the German, however, is forced to concede that, whereas in action the fiery valour of the French frequently slackens if it meet but with a temporary check, the dogged energy and resolution of English tars "have often achieved victory and glory." But, then, these latter peculiarities, though useful in a hand-to-hand encounter, are of less moment, he reminds us, in naval engagements where gunnery must decide the day.

On the question of discipline he greatly upholds the superiority of our neighbours, and adverts to the frequent excesses committed by English sailors, adding, by way of illustration, that—

"At Kertch, and in the Sea of Azoff we have had ample illustrations of the truth of these assertions, and the most superficial observer might have seen enough to convince him of their cogency. Excesses which were perpetrated daily among the English crews, such as when the whole contingent—seamen, marines, subordinate officers, aye, even officers—were disgracing themselves by drunken habits on land, at the very moment that their ship was ordered to sea, when they had to be brought on board by the police; such could not by any possibility have occurred in the French service."

A reader thoroughly ignorant of the character of our naval officers, and of the system under which they receive their training and professional knowledge, might suppose, from this unworthy attempt to sneer them down as utterly beneath their French rivals, that they were totally unfit for the trust reposed in them by their countrymen, and not worthy to wear the Queen's uniform. So clumsy and wholesale an attempt to traduce a body of brave and intelligent men is not worth serious refutation.

Let us now turn to what is said as to the resources of England in respect of her capabilities in manning the Navy. After glancing at the great preponderance of our maritime population (though, by the bye, his estimated numbers are a mere random guess), he attempts to investigate the organization of her seamen, and to consider whether it be adapted to enable her readily to command the services of a sufficient number to man her whole Navy at once, if requisite; the estimated aggregate for which purpose is, according to him, 150,000 men. But he insinuates further on, for our comfort, that this estimate is virtually beyond our actual wants, as many of the

ships figuring in our Navy list are worthless, and that we might therefore possibly do with less than the above number of men.

In his computation of the *personnel* of the British Navy, he contents himself with taking the first list at hand, which happens to be the one given in the budget of 1847—that is to say, pertaining to a period eleven years antecedent to the time at which he is writing, and to the date at which he takes his statistics of the French Navy, in making a comparison of the resources of the two Powers!

Inclusive of marines, dockyard labourers, &c., he makes our available force of fighting men 50,000,* a permanent maximum which he considers "can always be relied upon."

* This quotation, even from the numbers for 1847, is incorrect, for he asserts the numbers of seamen and ships' apprentices to have been 34,000; marines, 12,000; and 6,000 coast-guardmen; dockyard labourers, 10,000.

The actual numbers were:—

Seamen		27,500
Boys		2,000
Marines (including 1000 additional for six months)		12,000
Total of all persons employed in the dockyards, 1847–1848:—		
Superintending officers	459	
Established workmen	9243	
Hired ditto	2131	
Factory labourers	1170	
		13,003
Total		54,503

The difference, perhaps, is not very material, but still it serves to show the vague character of the assertions in the article generally.

Any one professing to write authoritatively on a subject of this importance should at least begin by providing himself with the latest and most authentic statistics. Had this writer done so, he would

As he has just before given us in detail the present *personnel* of the French Navy at 92,000 men, he quietly leaves us to the enjoyment of the comparison without comment. How we are to place our hands upon the reserve involved in his estimated aggregate of 150,000, before stated, he does not venture to guess, being obviously content to point out the ugly predicament in which he thinks he has left us.

In speaking of our mode of obtaining crews, he says, that in time of peace we have usually found our system of voluntary enlistment fully adequate to our wants, "but that in war it has always failed, and never more signally than in the late war with Russia." Notwithstanding inducements of every kind, in the shape of bounties, prize-money and pensions, it is notorious, says the Leipsic authority, that all our ships then in commission were, with few exceptions, short of fully one-fifth of their complements of hands, while many vessels were lying idle in port from our sheer inability to man them. Sir Charles Napier's statement is of course quoted, to the effect that in 1850 it would have been impossible for the English

have found the number of men for the years 1858–59 to have stood thus:—

Seamen (including 3500 coast-guard), . .	34,400	
Boys	6,100	
		40,500
Marines		15,000
Dockyard employés:—		
Superintending officers		479
Established workmen		10,850
Hired ditto		1,365
Factory labourers		2,361
Total		70,555

In fact, 20,000 more men than the reviewer gives credit for.

fleet, in its then short-handed condition, either to have coped with a first-rate Power, or to have repelled an invasion. But, notwithstanding the difficulty of procuring men, he distinctly asserts—and we will not venture to dispute the point—that impressment could be resorted to no more: a conviction which he alleges has caused the coast-guard service, modelled upon the *équipages de ligne*, to be organized. "But this institution," he adds, "is as yet too recent to supply the present deficiency, and the inducements held out to the British sailor generally, to serve on board a man-of-war are not sufficiently great to tempt them to join very rapidly."

But, lest we should be dismayed at the picture he has drawn, we are reminded that half of our labouring classes are more or less connected with the sea, while the whole seafaring and river population of France does not in all probability amount to 300,000, though he says the Navy has latterly become far more popular there than it was of yore.

Of the important subject of dockyards and arsenals, the essay before us does not profess to treat, even in the most cursory manner.

The deliberate object of this writer's reflections may therefore be considered to be: to create an impression on the Continent that, with *matériel* about equal, the *personnel* of the French Navy on the whole exceeds our own in efficiency; and that, from its compactness and readiness for action, the naval power of France may fairly claim to rival that of England: hence that respectful deference shown of late by our Government to the will of the French Emperor. With regard to the often-mooted subject of the invasion of these shores, Napoleon III. might, it is added, unquestionably attempt it with better prospects of success than his uncle. While British ships are neces-

sarily scattered over the globe, France can readily concentrate her whole Marine upon one given point, and she possesses, besides, perfectly organized means of transport, enabling her to throw upon our ill-guarded coasts no inconsiderable portion of her land forces, previously collected at Brest, Cherbourg, and Dunkirk. The probable consequences of a proceeding of the kind are not discussed, the German writer abruptly dismissing that topic with a sententious observation to the effect that, as regards the Navies of the two countries, their mission is different and distinct, their object being dissimilar.

France, as a first-class European Power, must, in his opinion, have a sufficient fleet; but to employ all her strength in augmenting her Marine, would be against nature, no less than against the character of the country and of the people. England, on the other hand, he admits, has an exclusive vocation for the sea—it is vitally essential to her to maintain her position as the first naval Power of the world. Her insular position, her wealth, her widely-spread colonies, entitle her, it is conceded, to assume that position, but, in order to enable her to retain it immutably, she must not relax her efforts, nor blindly ignore the progress made of late by other Powers; for "commercial states which do not adequately support their policy by maintaining requisite military power both by sea and land, are likely, as history teaches, to have their prosperity and independence continually threatened, and to lead a troubled existence."

This concluding passage of the review is, indeed, so replete with sound views and wholesome warning, that a warm encomium and hearty thanks may be cheerfully awarded to the German critic for giving such earnest utterance to the truths it enunciates, and as it has been

frequently unavoidable, during our examination of this essay, to express an opinion widely different from the statements it propounds, and to regret at the same time the disparaging tendency of the remarks bearing upon ourselves—not to mention a general absence of candour on the part of the writer—it is so much the more satisfactory to us to find an opportunity of parting with him, at least, upon good terms.

CHAPTER III.

COMPARISON OF THE NAVIES OF ENGLAND AND FRANCE.

Progressive state of the Navy from 1515—System of rating, time of William III.—Rating, 1727—Increase of armaments, 1780—Introduction of the carronade—Its results—*Rainbow* and *Hebe*—Modern system of rating—The paddle virtually discarded since 1846—Opposition to the introduction of the screw—Classification of ships of the line—Cost of ships—Timber and labour requisite for building sailing ships and steam ships—Present state of sailing-ships in the Navy List—Critical examination of new vessels—Preponderance of unserviceable sailing ships—Summary of English and French sailing ships—Errors in Admiralty statement of French ships—English screw frigates—Detailed description of the *Mersey*—Sailing frigates—Expense of conversion—Iron-plated ships—Their advantages questionable—Their cost—French comments on the resources of England—Cost of the existing British fleet—Projected plans of the Admiralty—Estimated expense—Cost of past wars—Mistaken retrenchment bad economy—Comparative strength of English and French Navies, 1778–1850—Their present efficient state—Table of British men-of-war, guns, horse-power, tonnage—Proposed strength of French Navy—Expenditure of England and France on victualling, clothing, labour, &c.—Gunboats—Warnings in 1858 of the increase of the French Marine—Lack of information at the Admiralty—Comparative state of the two Navies in 1850 and 1854—Resources of France—Recommendations of the French commission, 1851—*Personnel* of the French Navy—Summary of vessels now in the three steam ordinaries.

THE purport and limits of the present work do not permit the author to attempt giving even a brief sketch of the past history of the Navy. His object is simply to present

a clear and accurate statement of its present condition, to contrast it with that of our ally, and then, in a subsequent chapter, to show the relative strength of the Marine of other Powers; but, with the view to a more thorough elucidation of the subject, it is essential in the first instance, to say a few words with regard to the size and character of the ships of war of bygone days. The first three-decker on record, provided with port-holes for the discharge of ordnance, was the *Henri-grâce-à-Dieu*, launched at Erith just 344 years ago. She is said to have had four masts, to have been of the burthen of 1000 tons, and to have carried 80 guns. But as the mode of computing tonnage in those days was almost as vague and arbitrary as that by which the calibre of cannon was designated, we have no means of accurately estimating the size or power of this ship. Little indeed is known about her, except that she was still in existence nearly forty years afterwards, and figured in the official Navy List in 1552 as the *Edward*. The next British man-of-war of any celebrity was the *Sovereign of the Seas*, launched at Woolwich in 1637, and said to have measured rather more than 1600 tons. She had three flush decks, a forecastle, quarter-deck, and round-house. Her armament altogether was 100 guns.

In 1546 the Royal Navy comprised fifty-eight vessels of all kinds, inclusive of pinnaces and row-barges. "Ships Royal" at that time measured about 1000 tons; second-rates about 700; smaller vessels, 350; while the pinnaces averaged from 150 to 200 tons.

In 1578 the entire Royal Navy consisted of twenty-four vessels, the largest being the *Triumph*, 1000 tons; the smallest the *George*, 60 tons. At that period the mer-

chant ships of England numbered but 135 of 100 tons and upwards, and 656 of from 40 to 100 tons.*

It was not until about the beginning of the seventeenth century, that the ships of the Navy were first classified. There were then six rates, each subdivided into classes; but this arrangement was adopted rather as a convenient mode of regulating the payment of the crews, than to distinguish accurately the size or force of different ships.

It may here be remarked, that in the year 1641, the Navy of England consisted of forty-two ships, the aggregate tonnage of which was 22,411 tons. In 1858, Scott Russell launched in the Thames *one vessel* of 22,500 tons, greater in burthen by 89 tons than the whole British fleet two hundred years ago.

Towards the close of that century, a regular system was adopted for classifying vessels according to the number of guns they carried, the sixth being then, as now, the lowest rate. From an abstract, entering into minute details, and carefully prepared for Charles II., in 1677, it appears that England possessed at that time a total of 129 vessels of war, divided into 31 classes, and 10 sub-classes. A summary, framed thirty-seven years later, showing an

* The following table shows the progressive increase of the Royal Navy, at various intervals, from 1578 to 1814:—

Year.	Ships.	Men voted.	Navy estimates.	Tonnage.
1578	24	6,700	———	10,506
1603	42	8,346	———	17,055
1658	157	21,910	———	57,000
1688	173	42,000	———	101,892
1702	272	40,000	1,056,915	159,020
1760	412	70,000	3,227,143	321,134
1793	498	45,000	5,525,331	433,226
1800	767	135,000	12,422,837	668,744
1808	869	143,800	17,406,047	892,800
1814	901	146,000	18,786,509	966,000

increase of 70 ships, was classed under 10 different heads only. This diminution in the number of classes is thus accounted for by James, in the Introduction to his "Naval History." He says, that "some comprised only one or two vessels; the wreck or capture, therefore, of one, frequently annihilated a class. We find," he adds, "that between the years 1689 and 1697 the British Navy actually lost, by capture alone, fifty vessels; it is probable, too, that at least an equal number fell by the perils of the sea."

During those eight memorable years of William III.'s reign, however, fourteen vessels of considerable magnitude had been taken from the French, while seventeen ships of the line of eighty, three of seventy, and ten of sixty guns, and several vessels of lower rates, had been built in the various British dockyards.

About this time the system of rating underwent a further change. The first-rate, which always consisted of three-deckers, included no ship under 100 guns; the second, none under 90; the third, all below 90 and above 60; the fourth, all between 60 and 50; the fifth, all from 50 to 30; the sixth, all those below 30 not otherwise specially designated in the Navy List, as bomb-vessels, sloops, &c.

In 1727 the Navy comprised only 178 ships, divided into six rates. Of the first there were 7, with an armament of 28 forty-two-pounders, 28 twenty-four-pounders, 28 twelve-pounders, and 16 six-pounders. Of second-rates there were 13, carrying 26 thirty-two-pounders 26 eighteen-pounders, 26 nine-pounders, and 12 six-pounders. The third-rate comprised 16 ships with armaments of 26 thirty-two pounders, 26 twelve-pounders, 28 six-pounders; and 24 ships bearing respectively

26 twenty-four-pounders, 26 twelve-pounders, and 18 six-pounders. The fourth-rate was composed of 18 sixty-gun and 46 fifty-gun ships. The sixty-gun ships carried 24 twenty-four-pounders, 26 nines, and 10 sixes. The fifty-gun ships, 22 eighteens, 24 nines, and 9 sixes. The fifth-rate included 24 forty-gun and 3 thirty-gun frigates; the former carried 20 twelves and 20 sixes; the latter, 8 nines and 20 sixes. The sixth-rate consisted of 27 vessels, each carrying 20 six-pounders.

The tonnage of the first-rates was about 1860; of the second, 1560; of the third, 1360 to 1130; of the fourth, about 800; the fifth, from 600 to 400; and the sixth, about 380.

The armaments of first-rates, one hundred years ago, it will be seen, were far inferior to those of ships of the present day nominally of the same class. If we compare the weight of the broadside (1140 lbs.) of one of these ships with that of a modern ship of the line, of the same number of guns, it will be found to amount to not much more than half; while if, from the different tiers of cannon, we select individual guns for comparison, we shall scarcely find any of the largest guns then employed equal to the smallest now in use.

About the year 1780, towards the close of the American war, an attempt was made to increase materially the armaments of all ships in the service. The introduction of the carronade, an invention of that period, was destined to bring about an important revolution in naval warfare. As first designed, they were shorter than the Navy 4-pounder, and rather lighter than the 12-pounder, though the bore exceeded eight inches, and the solid shot they projected weighed 68 pounds. The captains of privateers, moreover, were not slow to appreciate the

capabilities of the new arm, and the Carron works were soon busily employed casting a large supply to meet the demand thus created; those most in request being 24, 18, and 12-pounders. These carronades had rather less windage than guns of the same nominal calibre; it had been even then discovered, that range and accuracy were much increased as the windage was reduced.

Routine and the want of unity of organization, ever the bane of our system, obstructed the earnest efforts of those who saw the advantage to be derived from the employment of this improved engine of naval warfare. Notwithstanding the manifest advantages of the carronade principle, as compared with the guns of that day, the Board of Ordnance for some time pertinaciously insisted on the superiority of the old guns, although the Navy Board showed over and again that any vessel capable of carrying the old-fashioned 4-pounders could, without the smallest difficulty, be fitted with the new eighteens. It took a long time, as it almost invariably does in such cases, to overcome official opposition to improvement or to innovation, however valuable its proved results. But, that it was eventually conquered, we have sufficient proof in the fact that in the year 1781—a time when England mustered 430 ships of war—604 carronades were distributed amongst them; of these, 8 were thirty-two-pounders, 4 twenty-four-pounders, 306 eighteen-pounders, and 286 twelve-pounders.

To give some idea of the difference of the armament of the same ship, on the old and on the improved principles, it may be mentioned here that a 44-gun frigate, with a weight of broadside equivalent to 318 lbs., was supplied experimentally with 48 carronades, and was thus enabled subsequently to deliver a broadside of 1238 lbs.

Before the close of the war in 1783, the carronade had acquired the general approbation of the service, yet, strangely enough, whenever a ship received any carronades in addition to her original armament, they were not taken into account, nor was any addition made to the crew to work these extra pieces.

The carronade will not of course bear comparison, for power or length of range, with a longer gun of the same calibre, or even with lighter guns of modern construction; but, its use at once clearly demonstrated the immense advantages of a reduction of windage and of rapid firing, as also of the destructive effects caused by large shot striking a ship with sufficient momentum to shatter, but without penetrating her side. At close quarters, its efficiency was always admitted, but vessels, armed with carronades only, have frequently suffered severely from an opponent provided with long guns, by the greater range of which they could be cut to pieces without the possibility of returning a shot that would reach their opponents.

The original adoption by us, of this implement of war, occasioned considerable astonishment and dismay on the part of our quondam foe. The *Rainbow*, the first frigate fitted entirely with carronades, was sent out on an experimental cruise, in the spring of 1782, to try the effect of her new ordnance. In September of the same year, she encountered the *Hébé* French frigate, of 1060 tons, and carrying twenty-eight 18-pounders and twelve 8-pounders, giving a weight of broadside of about 510 lbs. to oppose to that of 1238 lbs. of the English vessel. Several of the shot from the *Rainbow* fell on board the *Hébé*, when her captain, thinking, no doubt from their great size, that it would be useless to maintain a contest with an adversary, obviously so much more than a match, fired a broadside, and struck

his flag. The prize was one of the finest ships of her class we ever became possessed of, and her lines have been copied and re-copied times out of number. It requires very little knowledge of nautical matters to admit the obvious superiority, in a sea-fight, that must attach to a vessel, the weight of whose guns much exceeds that of her opponent; yet, it was not until comparatively recent times, that the Navies of different Powers began seriously to vie with each other in the introduction of the very destructive ordnance now in use, the largest known specimens of which are to be seen on board the new American frigates.

Having thus cursorily adverted to the classification of vessels of war in times gone by, we may now proceed to enumerate the rates as now established.

The first-rate includes all ships having three decks, carrying 110 guns at least, and requiring a complement of 950 men. The second-rate, one of her Majesty's yachts, and all ships carrying not less than 80 guns, requiring a war complement of 750 men and upwards. The third-rate the other Royal yachts, and all yachts bearing the pendant of an admiral, or of a captain superintendant of a dockyard, as also all ships of not less than 70, and under 80 guns, and requiring a war complement of 620 to 750 men. The fourth-rate comprises all vessels of from 30 to 50 guns, with complements of from 450 to 620 men. The fifth-rate, those with complements from 300 to 450 men.

Sixth-rates may be divided into three classes:

1. All other ships commanded by a captain.

2. Sloops and all other vessels commissioned by commanders.

3. All other vessels commanded by lieutenants, and having crews of not less than 60 men.

Steam-vessels are rated at the discretion of the Admiralty. Ships temporarily employed, either for surveying purposes, as transports, hospitals, store-ships, &c., come under one of the three classes of the sixth-rate.

The general introduction of steam has, to a certain extent, modified the above classification, as there can be no doubt that for the future, all ships intended for war purposes will be provided with the screw. Since 1846 the paddle may indeed be considered to have become virtually discarded; every ship now upon the stocks, without exception, is in course of being fitted with the propeller, though the late Surveyor of the Navy did all in his power for eleven years to resist the introduction of this great improvement. "Surely," says Mr. Reed*—and no one can help acquiescing in the justice of his remark—"the policy of placing it in the power of one prejudiced man to prohibit the nation for many years from rendering its greatest scientific achievement available in its own defence, when other nations were extensively adopting it, is deserving of nothing but unmitigated reprobation."

Upon reference to the list given in the Appendix (p. 33), it will be seen that the principal ships of the line in the British Navy may with propriety be divided into three classes. The first of these comprises the three-deckers, such as the *Duke of Wellington* and *Marlborough;* the second, the two-deckers, such as the *Windsor Castle* (101 guns); and the third, the smaller two-deckers, such as the *Edgar* 91, or *Cressy* 80. Then there are in addition the altered ships, such as the *Neptune* 90, *Queen* 90, *Tra-*

* One of the editors of the "Mechanics' Magazine," and the author of a very excellent treatise "On the Modifications which the Ships of the Royal Navy have undergone during the present Century."

Falgar 90 (which are three-deckers cut down), and the block-ships, such as the *Blenheim*, *Hawke*, *Hogue*, and *Pembroke*, all now 60-gun ships.

Of these block-ships, however, Sir Charles Napier rightly says, "they are unfit for the line, and the sooner they are put aside the better. The reduced masts and yards of four at least of them, almost suggest the idea that it was the intention of their projector that they should neither sail nor steam."

Sir John Pakington, too, in his parliamentary statement made at the commencement of the last session, alluded to these block-ships in the following terms:—"I have no hesitation in stating, that they are wholly useless. They are good for nothing as sea-going men-of-war; they might, perhaps, be useful as floating batteries, but as men-of-war they are perfectly useless. Most of them are rotten, and they are very nearly worn out."

Sir Baldwin Walker, in a report dated only as recently as September last, says:—"With the exception of some of the more recently-built frigates, there is scarcely a sailing ship which in its present state is fit to go to sea, and most of them require such extensive repairs that it would not be desirable to incur the expense. As regards the screw vessels, all the 80-gun screw ships which from necessity were converted, have the same armament as they had as sailing vessels, and are consequently so much pressed with their weights, and cramped for stowage, as to render them bad sea boats. . . . All these 80-gun screw ships ought not therefore to be considered as forming part of the effective screw force, but can only be regarded as vessels fit to replace the block-ships for home service. The latter, from their great age, are so defective that they will not be worth repairing after their present commis-

sion. To show the superiority of the French ships of the corresponding class (80 guns), it may be stated that 5 were reduced from 100, and 10 from 90-gun ships, and are, therefore, not only more powerful sailing ships, but better enabled to stow their machinery, &c., than the English 80-gun screw ships."

The prime cost of a screw ship of the line, such as the *Duke of Wellington*, an accurate representation of which appears as the frontispiece to this work, is—

For hull—labour	£30,652
„ materials	75,639
	106,291
For masts, rigging, sails, stores	19,224
For engines and gear	46,220
Total	£171,735

Then, the annual cost of maintaining in order a ship of this class (irrespective, of course, of the pay of her crew, &c.), is as follows:—

Hull	£6,377
Masts, sails, rigging	3,748
Engines, &c.	4,200
Total	£14,325

Amounting, in fact, to rather more than 8 per cent. on the original cost.

Of the amount of canvas requisite for such a ship, some idea may be formed, when it is stated that her entire spread of sail considerably exceeds an acre and a half; while, with respect to her spars, it may be added, that the mainmast alone, without the topmast, yards, or rigging of any kind, would cost very little less 500*l.*, the foremast about 380*l.*, the mizenmast somewhat more than 100*l.*, and the bowsprit and jib-boom about 220*l.* more. Her

anchors and cables weigh upwards of 100 tons, and the weight of provisions and stores, for six months' consumption of her crew, exceeds 300 tons. To build the hull of such a vessel would occupy 200 men twelve months, and to rig her completely, would require 24 riggers thirty working days of ten hours each. Independently of the cost of the application of steam to men-of-war, the actual expense of construction, from the greater strength and stability given to modern ships, has materially advanced of late years. For instance, the *Britannia*, 120, built some few years ago, required only 4150 loads of rough timber, and the labour of 218 shipwrights, while the *Marlborough*, 131, a screw ship of the same class, needed 6068 loads of timber, and the services of 334 shipwrights.* In 1852 the peace complement of a sailing three-decker was 970 men, at a cost of 26,700*l.* a year. There would now be, in addition to the annual outgoings of that period, to be provided for, the heavy item of fuel, sometimes amount-

* The following comparative statement shows the number of shipwrights, and the number of loads of rough timber, required to build the following ships, in one year:—

Names.	Guns.	Loads of timber.	Shipwrights for one year.
SAILING-SHIPS.			
Albion	90	4100	260
Rodney	92	3610	219
Arethusa	50	2530	178
Cleopatra	26	978	77
Atalanta	16	540	46
SCREW STEAM-SHIPS.			
Renown	91	4680	277
Bulwark	91	5500	310
Shannon	51	3366	222
Racoon	22	1816	122
Harrier	17	800	63

ing to 100*l.* and more per day, the expense of engineers, stokers, wear and tear of boilers, machinery, &c.

The following comparison between a sailing line-of-battle ship and a frigate, and steamships of similar classes, will show the heavy annual increase, under the item of sea-wages, occasioned by the substitution of steam, for sailing ships of war, and by the augmented rates of pay arising from the same cause:—

	Guns.	Men.	
1858, Marlborough (steam)	... 131	... 1100	... £35,248
1852, Britannia (sailing)	... 120	... 970	... 26,693
Increase in 1858	...	...	£8,555
1858, Shannon (steam)	... 51	... 560	... £19,341
1852, Arethusa (sailing)	... 50	... 500	... 14,585
Increase in 1858	...	...	£4,756

The increase in the complement of men in a steamship, as contrasted with a sailing-vessel of equal armament, chiefly arises from the establishment of engineers and stokers, whose duties are of course entirely distinct from those of the ordinary crew, who work the ship and her guns.

Ten years ago, the cost of the hull of a 50-gun frigate was little more that 50,000*l.*, while the *Orlando* (50), launched last year (provided with engines of 1000 horse power), absorbed within a fraction of 100,000*l.* The peace complement of a 50-gun sailing frigate was 500 men, at a yearly cost of 14,600*l.* The average pay of all ranks seven years ago was 39*l.* 14*s.* 8*d.*; it is now 43*l.* 2*s.*, or 3*l.* 9*s.* 4*d.* per man more.

From a report made by the Commissioners of Woods and Forests, about fifty years since, it appears that the tonnage of the Royal Navy was at that time computed to

be somewhat less than 800,000 tons. To build such a Navy, as ships were then built (consuming about one and a half loads to a ton), about 1,200,000 loads would have been required. The average duration* of a ship may be assumed at thirty years; exclusive, then, of 28,000 loads for repairs, about 85,000 loads, or a gross total of 110,000, would be annually consumed. During the last war a 70-gun ship required 3000 loads of timber, but, as has been already stated, from various alterations in the mode of building, the largest ships take nearer two loads than one and a half.

Not more than forty oak trees can grow upon an acre of land, so as to attain their full size or to yield each two loads of timber. In order, therefore, to build a ship like the *Marlborough* the produce of seventy-six acres of oak forest, of the growth of a hundred years, would be necessary; and to supply the demands of such a Navy as England possesses at this time, would absorb annually the produce of nearly 14,000 acres. The demands for the different dockyards of France, though not equal to those of our own, must still be enormous, not to mention those of other Continental powers. The wood-lands of England, Scotland, and Wales, have long ceased to contribute any very considerable quantity. The materials now chiefly in vogue for ships of war, both in this country and in France, are Italian oak and African mahogany. A singular circumstance has been noted in connexion with this

* At the end of fifteen years, on an average, the hull of each ship requires, however, a complete and expensive repair; during the last ten years, 35 ships of the line and 46 frigates have been removed from the effective list of the Navy; and on an average, three line-of-battle ships ought to be produced every year, merely to maintain the Navy on a proper footing as respects that class of vessel.

subject. It has been found that oak the produce of different countries cannot be employed in the same ship, if allowed to come in contact, as, from some organic action which takes place, the precise cause of which has not yet been ascertained, decay almost invariably takes place at either side of the junction. The lighter woods used for spars come chiefly from the Baltic, from Quebec, and even from the western shores of America. The *Fontenoy*, lately launched at Toulon, is remarkable for having her foremast made out of a single tree, no doubt a specimen of the *Wellingtonia gigantea*.

Of the long array of sailing line-of-battle ships, frigates, and corvettes, that now figure in the Navy List, only a very limited number can, as will presently be shown, be considered as seaworthy. They have an imposing appearance, it is true, as they "repose in perfect stillness on their shadows" at Sheerness, Chatham, or at Devonport; but never more "will they, at the call of patriotism or of necessity, ruffle their swelling plumage, nor, putting forth their beauty and their bravery, collect their scattered elements of strength, nor awaken again their dormant thunder." Those of them, to which an auxiliary screw can be satisfactorily applied, will probably be converted into steamers. Unfortunately, however, this process of conversion, though always costly, is far from being invariably successful. Even, of the eight converted 80-gun ships—viz., the *Mars* and *Majestic*, built in 1853; the *Meeanee*, built (at Bombay) in 1849; the *Centurion*, in 1844; the *Brunswick* and *Goliath*, in 1842; the *Cressy*, in 1853; and the *Colossus*, in 1848—hardly one can be deemed fit to be sent any distance from these coasts. They are all extremely crank, have small space for the stowage of coal and stores, and bad accommodation for

their crews. They can, consequently, only be regarded as somewhat more useful than the nine memorable block-ships, about which so much discussion has arisen, and which have indeed received the almost unqualified condemnation of the Surveyor of the Navy; nor can his decision excite much surprise, considering that the most venerable of them, the *Ajax*, was constructed as far back as 1809, and the most recently built, the *Hawke*, as long ago as 1820. They have been expensive ships in their time, their conversion having cost upwards of half a million, and yet there is little probability that they will ever be commissioned again, unless in case of some immediate emergency.

Of our other sailing ships of the line not already adverted to, there are several, such as the *Royal George*, built in 1827, and the *Windsor Castle*, as lately as last year, which will not bear examining with too critical an eye. In addition to other defects, the tremendous weight of their spars and upper decks is an evil which would seriously militate against their efficiency in war. The *James Watt*, and the *St. Jean d'Acre*, again, have not sufficient steam power in proportion to their size; on the other hand, however, the *Renown*, and *Orion*, are not likely, for the present at least, to be surpassed. The latter vessel has, under steam, attained a speed of nearly thirteen knots per hour, and that, too, without any extraordinary consumption of coal; the *Renown*, slightly (36 tons) larger, may justly be considered one of the finest vessels of her class in existence. That being the case, it will be satisfactory to the public to know that the *Hood*, *Atlas*, *Defiance*, *Revenge*, and *Edgar*, all now upon the stocks, have each nearly the same lines and dimensions as the *Renown*. The *Victor Emanuel* (formerly the

Repulse) and the *Conqueror*, though fast ships, cannot, within a knot per hour, compete in speed with the *Renown*.

We may well strike off from the list of British frigates and corvettes the *America, Eagle, Gloucester, Vindictive, Warspite, Java, Lancaster, Portland, Worcester, President*, and *Winchester* and those in a still more hopeless state, as the *Minerva, Mercury, Leonidas, Laurel, Latona, Hamadryad, Fisgard, Circe, Cerberus, Stag, Mœander, Leda, Isis*, and *Africaine*. Eleven of the above vessels have never been in commission; this also may be said of the *Octavia, Sutlej, Severn*, and *Phœbe* (now converting), and of the *Active, Flora, Niobe*, and *Creole*.

If, then, we exclude all but really serviceable vessels, instead of 35 line-of-battle ships, 70 frigates, and 43 corvettes and sloops, there will remain 13 ships of the line, 12 frigates, and 18 corvettes or smaller frigates, which will convey a much more accurate idea of the state of this portion of the Navy.

The catalogue of sailing vessels on the following page, furnished by Sir Baldwin Walker, professes to include all that can be considered effective of each class; it requires, however, some explanation. In the first place, if from the 35 English line-of-battle ships we deduct those converting, or ordered to be converted, there will not remain more than one (the *St. Vincent*) that can be deemed seaworthy. Of the rest, some, it is true, may be used for a few years as coal-hulks or receiving ships, but the remainder, such as the *Illustrious, Imaum, Egmont, Implacable, Achille, Foudroyant, Carnatic*, &c., can only be regarded as fit for firewood. The last-mentioned, like the *Nelson, Bombay, Clarence*, and *Hindostan*, has never been commissioned.

that mast is consequently stepped in the keelson itself. The armament of this noble vessel consists of—

	Weight of broadside.
On the upper deck, 12 eight-inch pivot guns, 10 ft. 6 in. long, each throwing a solid 68 lb. shot	408 lbs.
Main-deck, 28 ten-inch guns, 9 ft. 4 in. long, each throwing hollow shot of 84 lbs.	1176
Total	1584 lbs.

The aggregate weight of these 40 guns, without their carriages, is 178 tons, 3 cwt. and 2 qrs.

Of the imposing list of fifty 42 and 40-gun sailing frigates (given at p. 44 of the Appendix), not more than fifteen at most are worth conversion, or likely ever to be commissioned again; the rest are unworthy to figure in the navy list. Three is the number of frigates officially prescribed to be launched annually in time of peace; this year, however, five new vessels of that description will be added to the fleet; these are the *Narcissus*, 50 guns, and 400 horse power; the *Immortalité*, 50 guns, and 600 horse power; the *Bacchante*, 50 guns, and 600 horse power; the *Ariadne*, 32 guns, and 800 horse power; and the *Galatea*, 28 guns, and 600 horse power. In addition, the four sailing-vessels of this class (averaging from eight to ten years old)—*Phaeton*, *Phœbe*, *Sutlej*, and *Severn*—are to be forthwith converted, and at the same time to be lengthened, forward, aft, and amidships. It is to be hoped that the experiment may prove successful; it will undoubtedly be costly. The expense for timber and labour alone will, in each case, be 42,000*l.*, and the engines (at 50*l.* to 60*l.* per horse power—the usual price for engines) 30,000*l.* If to all this we add, for extras of various kinds, 3000*l.*, these converted frigates will, at the

lowest computation, not be turned out fit for commissioning at less than 75,000*l.* a piece. But it must be remembered that in their present condition they are all but useless, and to construct anew such vessels as these are expected to prove, would, besides occupying a much longer time, cost little short of 120,000*l.* each. As it is, it will be seen that an addition, during the current year, of nine screw-frigates to the Navy list may fairly be reckoned upon.

The determination of the French Government to build a number of iron or steel-cased ships imperatively obliges us to follow their example. The original idea of plating ships in this way, so as to render them shot-proof, is due, not, as is generally supposed in this country, to the present Emperor, but to a captain in the French Navy, who, about a quarter of a century since, suggested that all wooden vessels should be sheathed with composite slabs of iron of fourteen or fifteen centimètres in thickness; that is to say, with stout plates of wrought-iron having blocks of cast metal between. A similar suggestion was made amongst others by General Paixhans; but one of the first to reduce it to practice, was Mr. Stevens, of New York, the well-known steam-ship builder, who about ten years ago communicated to Mr. Scott Russell the results of a long series of experiments, instituted by the American Government for the purpose of testing the power of plates of iron and steel to resist cannon-shot. Mr. Lloyd, of the Admiralty, proposed the adoption of plates four inches in thickness, instead of a number of thinner sheets, as recommended by the Emperor. The English and French floating batteries were, as is well-known, protected upon Mr. Lloyd's plan. From trials recently made, however, it has been pretty well ascertained that this iron planking, on whatever

principle applied, will only repel hollow shot or shells; heavy solid projectiles of wrought-iron, or those faced with steel, having been found, on repeated trials, to perforate the thickest covering which has ever been adopted, and that, too, even at considerable ranges.

Mr. Reed, already alluded to, proposes to protect only the midship portion of the ship, and to separate it from the parts fore and aft by strong water-tight compartments, so that, however much the extremities might suffer, the ship would still be safe and the crew below protected, but, as he himself admits, there would obviously be no defence against raking shot.

The French vessels last alluded to, follow the lines and dimensions of the *Napoléon* (one of the best, if not the finest ship in their Navy); but they will only carry 30 or 36 guns, and the metal sheathing will be from ten to eleven centimètres (about 4¼ inches) in thickness. Two similar ships are to be commenced here forthwith; and as the First Lord of the Admiralty has prophetically warned us that they will be the most expensive ships ever constructed in this country, it is earnestly to be hoped that they may be found proportionately valuable, should their powers ever come to be tested: they will each cost from 126,000*l.* to 130,000*l.*, or 4,200*l.* per gun; the ordinary expense of a sailing man-of-war being about 1000*l.*, and of a steamer from 1800*l.* to 2000*l.* per gun.

The result, then, of the proposed additions to the fleet during the ensuing year will be twenty-six men-of-war, including the two last specified; and this, it seems, is the limit of the aggregate capacity of our dockyards: the Admiralty authorities, however, are justly of opinion that we must not, under the circumstances existing around us, rest satisfied with that achievement.

Upon careful computation, it appears that between 1848 and 1858 we have built 24 ships of the line, 21 frigates, 35 corvettes and sloops, 1 floating battery, 2 gun vessels, 186 gunboats, 2 troop sloops, 2 tenders, and 1 yacht. During the same period "the screw" has been applied to the stern-posts of 9 line-of-battle ships, 7 block-ships, 4 mortar-ships, and 1 store-ship; while a good many vessels have been bought.

It is proposed, that we should have, by the autumn of 1860, 15 more screw line-of-battle ships; thus raising the entire number to 56, as well as a considerable augmentation to the list of frigates.

Few events in this country have excited greater amazement in France than this announcement, revealing as it does the magnitude of our resources and the extent of our capabilities for naval operations.

A Paris paper, commenting upon the subject lately, observed, with some exaggeration, that all the dockyards of the world could not, even by combining their efforts, accomplish in one year what we intend to do before the spring of 1860. Nor will the outlay, in comparison with previous expenditure,* prove so enormous as might at first sight be supposed. The entire fleet now in existence (including as well available as unseaworthy

* The money votes in the six years from 1852 to 1858, for labour, timber, and stores, for the purposes of building and converting ships, and keeping the Navy in repair, exclusive of the purchase of steam-engines and coal, and building vessels by contract, amounted to 14,105,096*l.*; the amount provided during the late war for building gun-boats and floating batteries, and other vessels, was 1,633,147*l.*, but a sum exceeding 3,000,000*l.* was actually expended. The whole sum expended between 1852 and 1858, and voted in the latter year for labour, including superintendence and materials, but not including ordnance, amounts, it will be seen, to about 24,000,000*l.*

ships) has cost, in round numbers, more than thirty millions, yet we are assured that the present effective strength of the whole will be just doubled by a judicious outlay of one million. True it is, that a good deal of the proposed operations will consist of conversion rather than of entire construction, and it must be borne in mind that not a few of the ships that will be launched this year, have been already for some time in process of building.

It was indeed high time that some really important steps should be taken, such as those above detailed, as in reality, if not nominally so, our Marine was unquestionably becoming weak, not only in comparison with that of France, but with what we formerly possessed and ought indubitably to keep up. It must always be our fate to work at a disadvantage in this respect. All other powers may keep up what fleets they please, but it is incumbent upon us, under all circumstances, to take the lead in maritime power in developing the progress of nautical science. We can well dispense with such standing armies as some Continental nations maintain; we have no need of a long chain of fortifications along our coasts for our protection; but it is absolutely essential to our existence that we should have the largest fleet of the best-appointed ships, carrying the most powerful armaments that money can procure or human skill can devise.

To work, then, we are going. At this very moment the forge hammer is being plied, the seasoned forests that have been in store for years will shortly be sawn up and moulded into more *Scourges, Devastations, Terribles, Retributions,* and *Thunderbolts,* for our defence and the chastisement of foes who may dare to defy us.

The plans of the Admiralty and their cost have been

fully detailed. The total sum required for the Navy is 9,813,181*l.* for all purposes; so that on our fleet the disbursement for this present year of grace will be, in round numbers, rather more than 20*l.* a minute! Could we but conscientiously keep aloof from the disturbances occurring in other parts of Europe, and could we consequently lay up our ships in ordinary, and reduce the different establishments in the arsenals and dockyards to the lowest footing compatible with the maintenance of order at home and in the colonies, we might no doubt at once save half the money. But, as there seems now little prospect of so Utopian a state of things, we must even make the best of it; and, taking into further account things military, set down in the national ledger—"To insurance for one year against foreign aggression, 21,000,000*l.*"

Were not this continually increasing outlay, year after year, imperatively required, how many magnificent public works might be achieved; what noble undertakings might be carried out with even a small portion of that vast sum now absorbed simply in the preparation of instruments of destruction, and in devising the most effectual and scientific methods of slaughtering our fellow-men! The world, however, must be taken as we find it; and since there is, in so large a proportion of the human race, an innate propensity to quarrel, and as past experience teaches that hostilities, even among the most civilized nations, not unfrequently arise from causes apparently the most frivolous, it behoves us to be prepared betimes, and ever ready to be up and doing.

It might be thought, indeed, that we had had enough of deadly feuds and battles, seeing that, out of the 167 years intervening between 1688 and 1855, 67 were devoted

to war and carnage. During the whole of that time, whoever else might be against us, the French were our most constant and indefatigable enemies; only once, and that during the late Russian war, were they our allies. The aggregate cost of those 67 years of struggle with our various foes on land and at sea, was just 1,500,000,000*l.*, or on the average, rather more than 22,000,000*l.* a year—that is, about 85*l.* per minute during that long period!

It is difficult to form any adequate conception of so vast a sum; to assist in doing so, it may be observed that, were the said 1,500,000,000*l.* exhibited in the form of gold, it would present an accumulated mass of 750 cubic yards of that metal, which might be built into a solid column 15 feet square, and 112 feet high!

This consideration, contrasted at the same time with the advantages gained, may give rise to salutary reflections as to the inexpediency, if not the utter folly, of all warfare, except that undertaken at the stern bidding of necessity. Still, though "perpetual peace is the dream of the wise, war is the history of mankind;" and as that state, sooner or later, will inevitably recur, both experience and common-sense show that the only mode of avoiding disastrous results is to be fully prepared at all points for such a contingency. We have had to pay dearly enough for the short-sighted policy, and mistaken retrenchment, that occurred in more than one government department some four or five-and-twenty years since. We have much leeway to make up, in order to neutralize the supine indifference—to use no harsher term—of that period. The unwise economy then practised, lays a more than usually heavy burthen on the country now. Frequent warnings have been uttered to this effect; the doings in the French dockyards and arsenals, at a time

when the British public imagined that the mere ordinary peace establishment was being maintained there, have been significantly pointed out from time to time by the Press.

Owing materially to the above cause, the annual expenditure on the Navy has risen from 4,000,000*l.*, at which it figured in 1835, to nearly 10,000,000*l.* in 1858.*

A great variety of statements have of late been put forth by English and Continental newspapers, purporting to give the present strength of the British Navy;† but most of them have, from various causes, exhibited such discrepancies, that to the majority of them people have been able to attach but little credence. Mainly to supply this want of reliable information, the list at the end of this volume has been prepared, showing, as it does, accurately, the precise condition of the Navy at the present time.

* 1835 is the model year to which such economizers as the so-called "peace-praters" delight to refer, when they press for a wholesale reduction of our expenditure.

† The following classified statement shows the number of British and French sailing ships, at the undermentioned periods :—

Years.	Ships of the line.		Frigates.		Sloops and brigs.		Total.	
	British.	French.	British.	French.	British.	French.	British.	French.
1778	126	68	126	54	71	96	323	218
1794	145	77	176	72	67	...	388	...
1804	175	50	244	32	171	...	590	...
1812	245	113	272	72	314	...	831	...
1815	218	69	309	38	261	...	788	...
1820	146	58	164	39	145	38	455	135
1825	120	58	156	42	173	61	449	161
1830	106	53	144	67	102	83	352	203
1840	89	44	108	56	87	89	284	189
1845	88	46	104	50	83	72	275	168
1850	86	45	104	56	79	87	269	188

In proceeding to estimate the actually efficient portion of our Navy, we shall, for reasons already stated, exclude two hundred and odd sailing vessels, and confine ourselves to the steam-vessels afloat and building: they will be found enumerated below, and stated with still greater precision in the Appendix, p. 51.

If we refer to the list of the French Steam Navy in 1858, given in the Appendix, we shall find that they possess 37 screw ships of the line; 38 screw and 19 paddle frigates, besides 4 to be covered with five-inch iron plates, and now in process of construction; 20 steam corvettes; and, including gun-vessels, floating batteries, screw gun-boats, and transports, complete and building, or ordered, exhibiting a total of 265 vessels, mounting collectively 5,500 guns, and provided altogether with engines of 77,820 horse power.

When we contrast this powerful force of ships of the line and frigates with our own reliable ships of those classes, it cannot be said that we are as well provided as we ought to be.

On the opposite page is given the last official statement issued by the Admiralty of the state of the Steam Navy* of this country; but as it has avowedly been made up only to the autumn of 1858, the few discrepancies between it and the more recent catalogue supplied in the present work show precisely the changes that have taken place in the last four months.

* At p. 52 of the Appendix will be found an accurate statement of the steam-vessels of every description built, converted, or purchased, from 1848–58 inclusive.

Official List of the English Steam Navy.

	No.	Guns.	Horse power.	Tonnage.
Line-of-battle ships, completed	29 ...			
Ditto receiving engines . .	4 ...			
Ditto converting	6 ...	4735 ...	29,050 ...	155,885
Ditto ordered to be converted	1 ...			
Ditto building	10 ...			
	50 ...	4735 ...	29,050 ...	155,885
Block-ships	9 ...	540 ...	2,800 ...	16,033
Frigates (afloat and building) screw 25, paddle 9 . . .	34 ...	1239 ...	18,690 ...	75,308
Mortar-ships	4 ...	48 ...	850 ...	4,731
Corvettes and sloops . . .	82 ...	971 ...	23,702 ...	84,766
Small vessels	27 ...	100 ...	4,766 ...	14,278
Gun-vessels	26 ...	116 ...	5,350 ...	17,535
Gun-boats	162 ...	333 ...	8,820 ...	38,125
Floating batteries	8 ...	120 ...	1400 ...	13,998
Total . . .	402	8202	95,428	420,159

Exclusive of 62 troop-ships, store-ships, yachts, tenders, dispatch-vessels, &c., making an aggregate of 464 steam-ships and vessels, 8246 guns; horse power, 105,962, and 457,881 tons.

The following comparative view shows the relative strength of the two Navies in line-of-battle ships and frigates, built, building, or converting, and gives at the same time the aggregate number of their guns and horse power:—

ENGLISH.

	No.	Guns.	Horse power.
Ships of the line afloat (screw) . .	33 ...	3089 ...	17,550
Ditto building, &c.	17 ...	1646 ...	11,500
Frigates:			
Afloat	28 ...	993 ...	15,090
Building, &c.	6 ...	256 ...	3,600
Total line-of-battle ships and frigates	84	5974	47,740

FRENCH.

	No.	Guns.	Horse power.
Ships of the line afloat (screw) . .	32	2878	20,790
Ditto building, &c.	8	758	5,800
Frigates:			
Afloat	37	1216	17,000
Building, &c.	9	442	3,300
Total line-of-battle ships and frigates	86	5294	46,890

These are exclusive of the four iron-plated ships building, each of which is to mount 36 guns, and to be provided with 800 or 900 horse power. England, moreover, has afloat nine block-ships, each carrying 60 guns, with from 200 to 450 horse power.

Nine of the English ships of the line, carrying collectively 720 guns, and engines of 3600 horse power, are only 80-gun converted ships, and certainly inferior to the French ships of the same class. But, then, England has 15 ships of 100 guns and upwards, with an aggregate of 1694 guns, and engines of 10,800 horse power; while France has only six ships of 100 guns and upwards, with 700 guns, and 3740 horse power.

Table G (p. 114 of the Appendix) shows the comparative condition and numbers of the steam Navies of England and France, in January, 1859, according to the best information the Admiralty possessed at that time.

It appears, from a report of the Minister of Marine, prefixed to the French Navy Estimates for 1859, that it is intended within fourteen years from the present time to raise the French Steam Navy to 150 vessels of war of various classes, built after the best models, with engines of full power, in addition to 72 steam-transports, and in the meantime to complete the construction, at the several naval ports, of the dry docks and factories indispensable to meet the requirements of the new steam fleet. The

expense of these works is to be spread over the period extending from 1859 to 1871.

It is proposed to appropriate to them the annual grants for labour, materials, armament, new works, and repairs up to the year 1871, amounting collectively to 2,600,000*l.*; it is estimated that 1,920,000*l.* of this sum will be absorbed in the "yearly consumption of the steam navy, works of maintenance, and renewal of existing materials," leaving annually about 680,000*l.* for the increase of the fleet and the extension of the naval establishments. The sum which the French Government intends to devote, therefore, to the latter purposes, up to 1871, when the fleet will have reached the limit of its proposed extension, is not less than 8,840,000*l.*

In thirteen years, the proposed annual grant of 2,600,000*l.* would amount to 33,800,000*l.* Maintenance and renewal will absorb probably three-fourths, leaving 8,840,000*l.*, as above stated, to be devoted to the increase of the number of ships and naval establishments.

In the year 1858–59, the sum granted by the British Parliament for the same services in the Navy Estimates (including 757,000*l.* for naval ordnance and ammunition, provided for in the Army Estimates) amounted to 3,754,000*l.*, being 1,154,000*l.* more than the aggregate annual grants proposed by France for the next thirteen years. Before it can be ascertained how much of this, or of any smaller sum, can be applied to the increase of our Steam Navy and naval establishments, it will be necessary to determine the strength of the fleet to be kept in commission; for it is obvious that the greater the number of ships in commission, the larger must be the sum for outfit and repairs; and, consequently, the smaller will be the balance available for the increase of our existing

force. The French calculations are founded upon the supposition of a return to the peace establishment of 1852, the number of her ships in commission for 1859 being 152, against 175 in the former year, and the number of seamen afloat being 25,784 against 25,016 in 1852. Our position is very different. On the 1st of January, 1859, our ships in commission, and their complements, as compared with 1852, were as follow :—

	Ships.	Guns.	Complements.
1 January, 1859 . . .	267 ...	4649 ...	47,953
1 December, 1852 . .	203 ...	3584 ...	36,372
Increase . .	64	1065	11,581

The number of men is exclusive of a further increase of 3302 marines on shore, including 1800 employed on shore in China, also of 3880 seamen employed in the coast-guard on shore ; making a total increase in 1859, as compared with 1852, of 18,763 seamen and marines.

Since 1852, France has increased her screw line-of-battle ships from 2 to 37, of which there are 4 building and 4 converting, exclusive of 3 more ordered to be converted ; this has been effected by the conversion of 23 sailing ships and the building of 14 screw-ships.

During the same period, England has increased her screw-ships of the line from 17 to 52 ; 10 of which are now in process of construction, and 6 of conversion. Altogether 27 sailing ships have been turned into steamers, and 25 new screw-liners have been built or are now completing.

Since 1852, therefore, the addition to the French Navy of screw ships of the line, including those complete as well as those upon which work has still to be executed, is 35, while 33 of the same class have been added to the Navy of England.

Irrespective of the above are the 4 "frégates blindées,"

or iron-plated frigates, 2 of which are now in an advanced state at Toulon.

These ships are to be substituted for line-of-battle ships; their timbers are of the scantling of three-deckers; they will be provided with 36 heavy guns, 24 of them rifled, and 50-pounders, calculated to throw an 80-pound percussion shell. Such is the opinion of French naval officers respecting the tremendous power of these ships, that they fully anticipate the complete abolition, within ten or a dozen years, of all line-of-battle ships.

In the last six years, France has increased her steam frigates from 21 to 57, and England hers, from 22 to 34, and her 60-gun block-ships from 4 to 9. This great superiority in steam frigates on the part of France, in the event of war, might be of serious consequence to this country, especially in relation to the interruption of commerce.

On the other hand, the French steam corvettes and sloops, which in 1852 were 31, are now only 20, while those of Great Britain, which in 1852 were 59, are now, including large and small craft, as also 7 vessels since reduced from frigates to sloops, 142; our screw floating batteries are 8 as against 5 French; our screw gun-boats are 162, and those of France 28; and the entire Steam Navy of Great Britain now amounts to 530 vessels of all denominations, of which 464 may be deemed effective, while that of France numbers 265.

Besides the 52 English screw ships of the line already specified as built or completing, there are 4 more sailing line-of-battle ships destined to be fitted with screws. These would raise the number of English screw ships of the line to 56, and the whole could be completed by the year 1861. But at the present rate of proceeding in the dockyards, probably not more than 43 or 44 would be

ready by Jan. 1861; by that time, however, the French will be in possession of 40 screw line-of-battle ships, and certainly of 4, if not 6, of the iron-plated frigates.

It would be a difficult matter, with the present establishment of shipwrights and workmen, to make up the number of our available screw ships of the line to 56 before the year 1863; and in all probability, before that time still more considerable additions will have been made to the Steam Navy of France.

In addition to the 37 French steam ships of the line, and the 4 iron-plated frigates already built or building, the *Hercule*, launched in 1836, and *Jemappes*, launched in 1840, are well adapted in every way for conversion, though they would require in that case lengthening considerably. It is more than probable, however, that they will be *razéed*, have their armament reduced from 90 to 36 guns, and be turned into *frégates blindées*.

A commission, consisting of experienced naval officers, was appointed last year by the Emperor to revise the organization of the Navy; from their report we learn, that by the year 1860 the French Government will have a steam fleet which, with a proportion of large transports, would enable them to move an army of 60,000 men, with all its horses, ammunition, and materials, together with one month's provision for the whole; and that by the spring of 1860 they will have afloat, and in perfect order, a fleet of 40 screw ships of the line, 6 iron-plated frigates, 30 screw and 19 paddle frigates, and 26 steam transports of the class of the *Calvados*. This is surely a significant fact.

With respect to the sailing vessels of the two countries, England possesses a considerable superiority; we have (including hulks, receiving ships, &c., as will appear on

reference to p. 43 of the Appendix), 43 ships of the line. It is proposed to convert about 6 of these into steamers; of the remainder, not above 13 can be considered effective; some of the rest might possibly be converted into frigates. France has 14; and the author, speaking from recent personal inspection of most of them, is enabled to say that 3, or possibly 4, might be worth the expense of conversion. England has 58 frigates, of which 25 or 26 might yet prove effective. France has 40; 10, or perhaps 12, of these will be turned into steam transports. There are of course in both services a number of smaller vessels, but they need not be taken into consideration here; they will however, all be found enumerated in the Appendix.

The great increase of the French Steam Navy arises, as has been the case with our own, from the conversion of old sailing ships, a far less expensive process, of course, than the construction of a new vessel of the same class. The number of men required to convert a three-decker into a 90-gun screw vessel is five-eighths of the number that would be required to build such a vessel anew. The actual expense in the one case being 25,000*l.*, and the other 105,000*l.* It must not, however, be supposed that the converted will equal the new vessels either in efficiency or durability.

As regards the rapidity of the process, conversion has obviously greatly the advantage over construction.

Table E. (in the Appendix) shows the expenditure during seven years in England and France on account of pay, victualling, and clothing of seamen and marines, as well as that on account of new works, repairs, &c.; but for convenience, a summary is here furnished, the total, from 1852 to 1859, being as follows:—

England during a Period of Seven Years.

Victualling, pay, clothing	£25,331,264
New works, repairs, &c.	3,441,721
Labour and materials	24,406,601
	£53,179,586

France in the Seven Years.

Victualling, pay, clothing	£17,755,817
New works, repairs, &c.	2,819,901
Labour and materials and ordnance	18,369,666
	£38,935,384

The *Saturday Review* in the course of a series of very ably written articles on our national defences, lately adverted to one of the causes of our supineness in the progressive construction of screw line-of-battle ships and powerful frigates, putting the whole case in a few words, which may be appositely quoted here:—

"During the Russian war an almost universal cry was raised for gun-boats. When that war was ended, a reduction of expenditure was demanded with nearly equal vehemence. At the present moment the thoughts of the country are fixed upon the instantaneous creation of a powerful fleet of screw line-of-battle ships. But if ships are built in a hurry, they must be costly and short-lived; it is not possible with the most profuse expenditure to accomplish within a twelvemonth, what ought to have been the work of years. Even if we had the ablest and most energetic administration and the most open-handed House of Commons, we must nevertheless submit for some time longer to the mortifying sense of inferiority in naval strength to our nearest neighbour. The French, it appears, observing how eager we were for building gun-boats, left that portion of the operations of her alliance for the most part in our hands, and quietly

proceeded to construct the most powerful men-of-war they could, instead of concentrating all the resources they possessed upon the vigorous prosecution of a war which they very reasonably considered might not be the last in Europe. They have steadily acted upon the old-fashioned belief that the dominion of the seas must rest with the possession of the strongest fleet."

It was avowedly only in July, 1858, that our Admiralty became really aware of the formidable dimensions the French Marine was gradually assuming. The *Times* had on more than one occasion long before uttered notes of warning. The fact was perfectly well known to many private individuals, who freely volunteered information they had diligently acquired with some difficulty by their own exertions. The reply almost invariably was, however, that nothing could take place in the French ports or arsenals that was not duly reported by the various consuls to our officials at home.

Of the value of the information so obtained every one will form his own estimate from the admission of the First Lord of the Admiralty on the 25th of February last, that he and his coadjutors had only discovered six months previously what was long before patent enough to any one who had taken the trouble to investigate the subject. At the above time, the French fleet literally comprised as many screw line-of-battle ships as the Royal Navy itself—that is to say, each country possessed 29. The French numbered fewer three-deckers, but, on the other hand, we had 9 ships of the line inferior to any of theirs. Though numerically equal, therefore, there was a humiliating inferiority of efficiency on our side, in line-of-battle ships at least. Of frigates, France actually possessed 12 more than England. No reliable list of French ships, giving

trustworthy details as to their ages, capacity, power, &c., has ever hitherto been published in this country; the one now furnished, however, side by side with that of the Royal Navy, will show better than anything else the relative state of preparation of the two Powers. These important catalogues require to be attentively studied.

The reader will find that we have afloat 19 screw and 9 paddle frigates, while upon the stocks and rapidly approaching completion are six more "screws;" the total number of frigates will therefore stand 34. The French, on the other hand, have afloat 15 screws and 19 paddle steamers of this denomination, 1 converting, 3 receiving their engines, and 8 building, being a total of 46. This, compared with matters as they stood not many years since, is certainly a most unwonted state of things. In 1812 we possessed 245 ships of the line and 272 frigates; France but 113 line-of-battle ships and 72 frigates.

In 1820, the numbers were 146 English liners and 164 frigates, while the French possessed 58 liners and 39 frigates. In 1840 there were 89 English liners and 180 frigates against 44 French line-of-battle ships and 56 frigates.

In May, 1849 (according to a Parliamentary paper), our own Steam Navy consisted of—

(PADDLE-WHEEL.)	
Ships (5th-rates)	7
Frigates	7
Sloops	31
Gun-vessels	25
Total	70
(SCREW.)	
Frigates	8
Sloops	12
Gun-vessels	10
Grand total	100

In 1850 we had 86 sailing ships of the line and 104 frigates; France at the same time 45 line-of-battle ships and 56 frigates.

It may not be uninteresting to take a more complete review of the state of the Navy of France in 1851, in order the better to appreciate its subsequent augmentations.

She had then, in the year above mentioned, as appears from an official list of unquestionable authority, the following array:—

SAILING VESSELS.

	Afloat.	Building.	Squadron of evolution.	Harbour commission.	Total.
Ships of the Line	25	21	8	4	58
Frigates . . .	37	19	1	5	62
Corvettes . . .	30	5	0	2	37
Brigs	44	4	0	0	48
Small vessels . .	43	0	0	0	43
Transports . .	32	0	0	0	32
Total . .	211	49	9	11	280

STEAM VESSELS.

Ships of the Line	5*	2	0	0	7
Frigates . . .	20	0	2	3	25
Corvettes . . .	27	5	3	1	36
1st-class packets	32	0	0	0	32
2nd-class ditto .	25	3	0	0	28
Total . .	109	10	5	4	128
			Grand total		408

Three years later, while the Russian war was raging in 1854, France had in commission 4 first-rates, each of 120 guns; 5 second-rates of 100 guns; 10 third-rates of 90 guns; 5 fourth-rates, of 82 guns; 9 first-class 60-gun frigates; 12 second-class 50-gun, and 8 third-class 40-gun

* Four provided with auxiliary screw only.

frigates; then there were eight 30-gun and four 24-gun corvettes, thirteen 20-gun and three 10-gun brigs, six 4-gun brigs, 13 schooners, 12 cutters, 25 transports varying from 150 to 800 tons: the whole of the above being sailing vessels. Of those provided with auxiliary screws, there were the *Montebello*, a first-rate (120 guns, 500 h. p.); the *Austerlitz*, second-rate (100 guns, 500 h. p.); the *Fleurus*, the *Navarin*, the *Prince Jerome*, and the *Ulm*, each of 100 guns and 650 h. p., besides 5 third-rates carrying each 86 guns and provided with horse power from 450 to 960; the *Pomona*, 46-gun frigate and 220 h. p.; two corvettes, each of 46 guns and 120 h. p.; 18 small frigates with armaments varying from 6 guns to 20 (12 of them with 16 guns), and 15 with engines of 400 h. p., one of 650 h. p., and 2 of 540 h. p.

Then there were, in addition, 11 first-class corvettes of from 320 to 400 h. p., 19 second-class corvettes, each carrying 6 guns, with steam power of from 220 to 300 h. p.; of despatch boats there were altogether 65 in commission, of three different classes, and of horse-power ranging from 30 to 200; 3 mortar-vessels and 5 floating batteries.

It will thus be seen, that in a year of unexpected war, France had no difficulty in manning and fitting out 271 vessels, of which 131 were steamers. But at that time, her Marine was in a state of transition and experiment; sailing vessels were giving way to steamers, and war suddenly broke out in the midst of an unsettled state of naval affairs consequent upon the abandonment of a system which had long worked well, for one which required a totally new organization. The troops despatched to the East had been sent off hurriedly as they could best be forwarded. Serious inconvenience was experienced from

the want of a sufficient number of transports, which naturally led to the formation of a great number of vessels of this class, now built and building, so that this want at least is not likely to recur. In addition, the conversion of nearly all the old sailing ships (worth the outlay) into steamers is ordered, and no vessel of any importance will henceforth be constructed for the French Navy without being fitted with the screw. The great increase in her naval force may therefore be considered to date from the Crimean war. All the new ships of the line and frigates, besides being of great strength, are constructed from lines calculated to give the utmost possible speed. For the future, indeed, it will probably be found that the external build of all vessels destined for war, to whatever country they may pertain, will bear a strong resemblance to one another, losing much of their peculiar national characteristics.

The best idea of the gigantic exertions that have been made at all the French dockyards, from 1854 to 1859, will be seen at a glance on reference to the tabular summary at the end of the French Navy List* (Appendix, p. 59).

Nothing can show better than this does the extreme importance attached to the Report, elsewhere alluded to, of the Commissioners appointed, under a decree of October, 1849, to investigate the actual condition of the Navy and its prospective progress. The formidable extension it has since undergone is, in fact, little more than the

* A Paris journal of the 27th April last, after commenting on the naval forces of the two countries, observes, "We have 7 ships of the line, 53 frigates, 66 corvettes or sloops, 32 schooners and 8 brigs more than England; while she has 1 floating battery, 9 mortar vessels, 12 transports, and 130 gun-boats more than we possess.

realization of the recommendations of that Commission. The Board sat two entire years, from November, 1849, to November, 1851; it held upwards of two hundred sittings, some of them in Paris, many at the various naval ports. The Commissioners visited all the arsenals, and examined upwards of ninety witnesses. M. Dufaure, the president, was engaged in the preparation of his report, when the *coup-d'état* of the 2nd of December, 1851, summarily closed the investigation. The report, printed at a great expense at the National Printing Establishment, was never published, and very few copies only were struck off; probably not more than one or two ever reached this country; but they supply the fullest possible information as to the then condition of the French Marine, together with the resolutions of the Commission as to what ought to be done to amplify and extend it.

"The first point we have to determine," they observe, "is the number of line-of-battle ships we can and ought to have afloat the moment that war is announced." They then add, significantly enough, "on this point we have at least certain data. Our enemy is well known. *It can only be* ENGLAND." Some twelve or thirteen line-of-battle ships had been launched during the previous seven years, and it was recommended that fifteen of the ships then upon the stocks should be brought forward at the rate of two or three yearly; that, of the twenty-seven ships afloat, all those worth the expense, should be fitted with the screw; that the number of line-of-battle ships in commission, or in ordinary, should be increased to thirty, all to be provided with steam power; thus bringing up the total of that class of ships as rapidly as possible to forty-five.

It was further resolved, that twenty frigates of the first class should be provided with steam power, so as to give

them the greatest attainable speed; and that, of the thirty-eight ships of this denomination then afloat, as many as possible should be fitted with propellers (though only one at that time was a steamer), in order to convoy fast transports, laden with troops. No more sailing transports were to be built, but twenty steamers of large dimensions capable of carrying 1000 men, with all their equipments, were forthwith to be commenced.

The Commissioners plainly did not at the time intend to recommend raising the naval power of the country to the standard of 1788; the intention seemed rather to be, to rely for the future upon the possession of a great number of vessels of small rates, and on a large flotilla of transports. The obvious intention being, to cut up the foreign trade of an adversary, rather than encounter him in a general engagement. "Speed," it is remarked, "is the best weapon against an opponent better equipped, and having many weak points to protect. It is the indispensable requirement of that party whose resources are the smallest, who is less powerful afloat, and whose national character displays the *greatest amount of daring.*

* * * * *

"Were a war to break out with England in the Mediterranean, for instance, for it could be equally fought out there as anywhere else, we will imagine a fleet at Toulon composed of vessels of the first class, and capable of putting to sea; such a squadron need only have sufficient auxiliary steam power to execute manœuvres, or to overcome occasional difficulties of navigation. England would necessarily have to watch such a fleet, and must therefore keep no inconsiderable portion of her own naval power in the above sea; those ships would be far removed from their own depôts of fuel, while ours would be nearer home. Any

Rear-admirals are eligible only from captains of line-of-battle ships of eight years' standing, during four of which at least they must have been actually afloat. From the time, therefore, that a lieutenant has eliminated himself from the rudimentary stages of his profession until he reaches the dignity of admiral, an interval of twenty years must have elapsed.

A rear-admiral must have had the entire command of a squadron of not less than five vessels before he can become vice-admiral. Half the appointments on board frigates and corvettes, and two-thirds of those on board ships of the line, are given according to seniority.

The Emperor reserves to himself power (in war time) to abridge, by one-half, the different periods of service of all officers; but, with that sole exception, no promotions whatever can take place out of the prescribed course, and no one under any circumstance can obtain an honorary appointment. In the ships now in commission, there are, as has been shown, between 25,000 and 26,000 seamen constantly employed afloat. A regular routine of exercise is observed on board every vessel, whether she be attached to a squadron of evolution or in harbour, and every exertion is made by the officers to have each duty performed with the greatest smartness and precision.

It is not an unusual performance, even on board a line-of-battle ship that has not been more than six months in commission, to heave in ninety fathom of chain and make all sail within fourteen minutes of the appearance, on board the flag-ship, of the signal to "weigh anchor." A topsail will be shifted by an expert crew in little more than seven minutes and a half; and a whole squadron have been known in a gale, with a heavy sea running, to strike topgallant masts in nine minutes. The *Brétagne*,

2. The French Screw Line-of-Battle Ship, LA BRETAGNE, 130 Guns; 1,900 H.P. Launched at Brest, 1855.

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2. The French Screw Line-of-Battle Ship, LA BRETAGNE, 130 Guns; 1,200 H.P. Launched at Brest, 1855.

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not long ago, was observed to lower her three topsails, to take in a reef in each, and hoist them again, in rather less than two minutes and twenty-five seconds—a feat which probably the smartest ship's company in our own service would not readily surpass. An engraving of this fine ship is here annexed. Half a century ago the interior of a French man-of-war afforded a very different aspect from what it now presents. Everything that was worth adoption has been scrupulously copied from the English service, at the same time that some few obvious improvements of various kinds have been introduced. The spirit of the nation has evidently been roused; by indomitable energy and lavish expenditure they have created, almost from nothing, a stupendous Navy; with untiring perseverance they are adding to it from day to day. It has been already shown how, by means of the "Inscription," a certainty of obtaining a requisite supply of men can be ensured, and if ever the two greatest nations of the world should unhappily be involved again in war, we shall find that, so far from tamely acknowledging our supremacy on the ocean, France will be fully prepared to dispute it, and at all hazards to engage in a death-struggle, before resigning her pretensions to the brilliant prize she so ardently longs to clutch.

The whole seaboard of France is divided into five *arrondissements*, named after the five principal naval stations —Cherbourg, Brest, Lorient, Rochefort, and Toulon.

A *préfet maritime*, who is always a flag-officer, presides over each of these, as well as over the merchant harbours situated within his district. The subdivisions of the arrondissements are into *quartiers* and *syndicats;* the special function of the officers presiding over these last is to prepare, and keep carefully revised, an accurate

register of every sailor, as also of every man who "follows the sea" for a livelihood, or even earns a scanty subsistence by working in harbours, docks, upon canals, or in boats plying upon rivers.

Up to the age of sixteen every lad, after having had his name inscribed, and having satisfactorily passed a probationary year, is classed as a *mousse*. After sixteen he becomes an apprentice, and at eighteen a seaman. He is henceforward liable—whenever he may be called upon—to serve the State for a longer or shorter period, at any time during an interval of two-and-thirty years, or until he has attained the age of fifty.

At all the principal commercial ports a commissary-general is stationed, with a staff of officers under him, whose particular duty it is to attend to all the details of the maritime inscription.

The Minister of Marine is charged with the regulation of every branch of navigation; so as to encourage, by every means that may occur to him, the development of the nautical resources of the country, and to foster the production of the greatest possible number of sailors.

Such, then, is a brief summary of the naval resources of our present ally and possible antagonist; of the *personnel*, and more particularly of the "Inscription," further details will be given in the chapter which treats of the manning of the two Navies.

The following table will perhaps form the most appropriate conclusion to this chapter, since it exhibits at a glance the present condition of the available naval resources of the country, together with the complement of officers and men that would be needed, in the event of the occurrence of any emergency requiring the whole of these 132 ships to be sent to sea.

A Statement, showing the Number of Ships in what are termed the First, Second, and Third Divisions of the Steam Ordinaries at the several Home Ports; together with the Number of Officers, Seamen, &c., required for their Complements, if commissioned.

Divisions.	Ships of the line.	Frigates.	Corvettes and sloops.	Gun-vessels.	Gun-boats.	Total.
First division (ready, with stores on board)	4	4	3	3	15	29
Second division (ready, but stores on shore)	11	14	13	5	15	58
Third division (fitting)	4	3	6	3	29	45
	19	21	22	11	59	132

Total number of ships in 1st, 2nd, and 3rd divisions	132
Number of officers and men required to man them :—	
Officers	2,629
Seamen	17,428
Boys	2,978
Marines	8,219
Total	31,254

On the 23rd of April last (1859) orders were despatched to Portsmouth, directing that all vessels in the second-class steam reserve there, should forthwith receive on board their cables, gun-carriages, fire-hearths, &c.

CHAPTER IV.

NAVIES OF OTHER NATIONS.

Resources of Russia—Indifferent quality of Russian ships—*Personnel*—Swedish and Norwegian Navy—*Personnel*—Danish Navy—*Personnel*—Navy of the United States—Gigantic frigates—Paddle steamers still constructing—Intentions of Congress as to the armaments of frigates—Shell guns—Engraving of *Niagara*—Description of that vessel—Mr. Reed's contrast between *Niagara* and *Diadem*—Experiments on board the *Plymouth*, United States naval ordnance ship—Capt. Dahlgren's reports—His opinion of the *Diadem*, and of British line-of-battle ships, gunboats, &c.—Projected flotilla of American gunboats—United States sloops of war—Their constant want of repair—Superiority of United States merchant-ships in strength—Defective ventilation—Errors committed in seasoning timber—Old United States sailing ships—Naval architecture at a low ebb—United States dockyards—*Personnel* of United States Navy—Dutch Navy—*Personnel*—Belgian Navy—Spanish Navy—*Personnel*—Neapolitan Navy—*Personnel*—Austrian Navy—*Personnel*—Sardinian Navy—*Personnel*—Prussian Navy—*Personnel*—Greek Navy—Turkish Navy—Brazilian, Peruvian Chilian, and Mexican Navies.

Of the naval resources of other countries, besides those to which attention has already been drawn, we must be content to give a mere brief summary.

Let us commence with that of Russia, whose whole Marine is at present so entirely under process of reconstruction, that no very accurate estimate can be given of its eventual strength. Before the late war she possessed two squadrons of about equal power—one stationed in the Black Sea, the other in the Baltic. Each carried about 20,000 seamen, and about half that number of

marines and marine artillerymen, and the aggregate number of guns was between 8000 and 9000.

These two fleets comprised respectively about 25 ships of the line, 18 frigates, 40 corvettes and smaller vessels, and about 20 to 23 steamers. At the northern ports, in addition to the above proportion of ships, there were about 250 gun-boats. Of this large array of ships in the Baltic, not more than 16 or 18 ships of the line, 10 frigates, and as many corvettes, besides half the number of steamers enumerated, were in a fit condition to put to sea. An official list, indeed, dated 1853, shows the available strength of the Black Sea fleet at that time to have been composed as follows:—

5	line-of-battle ships, each carrying	. .	120 guns.
13	„	„ . .	80 „
7	„	„ . .	54 „
3	„	„ from 40 to	80 „
25	brigs, corvettes, &c., amounting together to		170 „
2	steam corvettes, each of		6 „

But of these, probably the majority would, by an English surveyor, have been condemned as nearly worthless for war purposes. Russian ships are for the most part constructed of fir, the worst material that could be selected, both as regards durability and its liability to splinter in action. The workmanship is usually very bad. A remarkable example of this was afforded very recently by a new first-rate line-of-battle ship, the *Cæsarewitch*, on her way from the Dnieper to the North, putting into Malta for repairs, almost in a sinking condition, frapped round and round her hull with cables and hawsers, and yet leaking so fast, that her crew were well nigh exhausted with their exertions in keeping her afloat.

Great activity is now prevalent at all the Russian dockyards, and the most strenuous efforts are being made to repair the loss of the fleet sunk in the harbour of Sebastopol. In 1854, Russia could only muster about 2 or 3 screw steamers. Since 1857 several have been commenced. The Baltic fleet is rapidly receiving reinforcements; and in the course of last year the squadron in the Amour alone was augmented by the addition of 10 vessels of various sizes, all built either in that or the preceding year.

The naval staff, exclusive of the Emperor's personal suite (comprising 2 rear-admirals, 2 wing-adjutants, and 3 captain-lieutenants), consists of a chief and a deputy, a master of ordnance of the reserve artillery, an inspector of the naval architects, a chief of the marine chancery, 2 adjutants-general, and 4 vice-admirals.

The Ministry of Marine includes a council of 10 admirals, a president, and 10 clerks.

To this department also belong a vice-admiral and 6 officer-inspectors; a lieutenant-general at the head of the hydrographical department, a medical director-general, and an auditor-general.

Besides the above, there is the engineering department, to which the superintendence of naval fortresses is committed; the marine training department, under the charge of an admiral; the marine intendancy, under that of a lieutenant-general; the marine commissariat; the shipbuilding, timber, and marine artillery departments.

The *personnel* of the Russian Navy includes—

16 admirals.
30 vice-admirals.
39 rear ditto.
111 first-class captains.
95 second-class captains.
257 lieut.-captains.
607 lieutenants.
396 midshipmen.

The corps of Marine Artillery comprises 281 officers. Besides which there are the companies embarked on board the Baltic squadron and that of the Caspian, 7 companies pertaining to the arsenal and 2 to the laboratory, under the supervision of 131 officers.

Considerable attention has been bestowed of late years in improving the *matériel* and the *personnel* of the Swedish Navy. The *matériel* is now also in a very perfect state of organization. It comprises 8 ships of the line (2 provided with screws), 1 screw and 5 sailing frigates, 3 screw and 5 sailing corvettes, besides a large number of gun-boats, mortar-vessels, transports, and 8 or 10 small steamers. Of these the greater number are at present in commission. The numbers above specified are irrespective of the Norwegian Navy, which also forms a portion of the naval forces at the disposal of H.M. the King of Sweden and Norway. It includes 2 steam frigates, one of 52, the other of 41 guns, and of 500 and 150 horse power respectively; 2 sailing frigates, one of 44, the other of 40 guns; 3 steam corvettes; 2 sailing ditto; 1 brig; 6 schooners; 5 small steamers, and 2 steam gun-boats, besides 121 row gun-boats.

Under the *personnel* are included 1 rear-admiral, 1 commandant, 3 captain-commandants, 12 captains, 12 lieutenant-captains, 24 lieutenants, and 33 sub-lieutenants, together with 350 petty officers and marines. The maritime inscription is said to include 46,000 men; the *équipages de la marine*, 20,000 Swedes and 13,500 Norwegians.

There is what is termed a company of ship-builders, consisting of 180 men, and 3 other companies, each about 120 strong, whose duties are respectively connected with the artillery and laboratory departments.

range and accuracy, and was long since condemned; yet, strange to say, this very objectionable gun actually constitutes the chief armament of some of our largest and finest frigates, avowedly built to cope with those of the description of the *Merrimac*, *Niagara*, &c. "Surely," says Sir Howard Douglas, "this defective shell-gun should be forthwith withdrawn, and the 68-pounder solid-shot gun substituted. There is ample displacement and deck room to admit of this; and we have the authority of Captain Dahlgren, and even that of the gallant captain of the *Diadem*, for asserting that the 95 cwt. solid shot 68-pounder may be worked as easily as a 32-pounder, and, it may be added, fired at long ranges with solid shot as rapidly at least as a 10-inch shell gun, which cannot fire solid shot."

The engraving, on the opposite page, of the celebrated *Niagara* will serve to convey a very correct idea of the external appearance of this class of frigate. She has no beauty to recommend her. Her length over all is 345 feet, breadth 55 feet, and draught of water 26 feet. She measures 5013 tons. Her engines, of which there are three, have separate cylinders, 6 feet in diameter, with a stroke of 3 feet. The blades of the screw are 18 feet 3 inches in diameter, and her greatest speed may perhaps amount to 12 knots per hour, though, when tried at New York, she did not achieve more than 11. Her stem is nearly perpendicular, and her sheer is very great. Altogether, in appearance, there is nothing about her to please the eye; but internally her accommodations are excellent, and the height between her decks is ample for all purposes. Her bunkers, however, are small, and will only hold about 11 or 12 days' consumption of fuel at full speed.

With respect to her armament, Mr. Reed's observations

8. The U.S. Screw Frigate, NIAGARA, 12 Guns (rated as 40 Guns). Launched at New York, 1856.

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The Danish Navy comprises 4 line-of-battle ships (1 fitted with the screw), 6 sailing frigates and 3 screw, 4 sailing and 3 screw corvettes, 4 brigs, 2 schooners, and a cutter. There are, besides, 3 screw gun-boats and several paddle-steamers, and about 20 transports; altogether 120 vessels of all denominations mounting 958 guns.

The *personnel* includes 1 vice-admiral, 2 rear-admirals, 5 commandants, 6 captain-commandants, 18 captains, 24 lieutenant-captains, 38 first-lieutenants, 39 second-lieutenants, a corps of cadets, a staff of 15 medical men, 3 auditors, and 5 clerks.

In addition to the officers, the naval forces comprise 2 divisions of reserves, including 265 artillerymen and 173 seamen, besides 327 caulkers and 1000 workmen; in all about 1750 men.

The Navy of the United States has a tolerably imposing appearance upon paper, comprising, as it does, 10 ships of the line, 11 sailing frigates, 21 sloops of war, 3 brigs, and a schooner; besides 7 first-class steam-frigates, 6 second-class, and 2 third-class, all fitted with screw-propellers: then there are, besides, 11 paddle-steamers, 2 steam-tenders, and 5 store-ships.

Of the above-mentioned line-of-battle ships, however, 4 are upon the stocks, and most of the others can hardly be regarded as seaworthy.

A writer in the "United Service Magazine," who has evidently given much attention to the subject of steam men-of-war, speaking of the American frigates, says, "There can be no doubt that Sir Baldwin Walker has added splendid and useful ships to the Navy; but when in attempting to imitate our Transatlantic cousins, he

designed the *Orlando*, *Mersey*,* and *Diadem*, it is much to be feared that he committed a great blunder, and that those ships will prove, on trial, to be as unsuccessful as their prototypes, the Yankee screw-frigates *Merrimac*, *Minnesota*, &c. The Americans indeed have never yet built a paddle-wheel or screw-frigate which has realized the expectations of its builders."

However well founded this opinion may prove to be, at all events the authorities in the United States have not yet abandoned the principle of building gigantic vessels, in order to carry a few heavy guns; and America, moreover, is now perhaps the only country where paddle-steamers for war purposes have not virtually been abolished, though it may be inferred from the followng resolution that they are gradually being superseded. By an Act of the last Session of Congress, making appropriations for the naval service for the year ending 30th June, 1859, the building of seven steam screw sloops of war, with full steam power, not over 14 feet draught, and of one paddle steamer, under 8 feet draught, is authorized: 300,000*l.* having been appropriated for the purpose.

The armament of five of the principal frigates belonging to the United States consists of shell-guns, varying from 8 to 11 inches, all capable of being used for solid shot as well. The shells for the largest guns weigh each 135 lbs. The larger guns are ranged on the gun-deck, the smaller on the spar-deck: these frigates have besides a 68-pounder, working on a pivot at the bow and stern. The 10-inch shell-gun, originally copied from the English piece of ordnance of that calibre, was found to be deficient in

* The preliminary trials of the *Mersey* at least have shown that the anticipations of the writer were not altogether well founded.

the working of the 9-inch gun is proportionately retarded, and the celerity of fire diminished; yet, even under the disadvantage of an inclination exceeding 5° and reaching to 18° at the extreme roll, a well-drilled crew was able to fire these shells at intervals of 65 seconds and 35 seconds. (General quarters, to test the time in which the battery of the *Pymouth* could be brought into action.)

"3. When the ship is still on an even keel the 11-inch gun cannot be fired as rapidly as the 9-inch, perhaps no faster than once a minute; but the motion or inclination of the ship that suffices to decrease the quick working of the 9-inch gun is exerted less favourably on the 11-inch, so that it is proportionally more controllable under such circumstances, and in manœuvring can be aimed much more rapidly. On one occasion 13 shells were fired from it, starboard and port, while the two adjoining 9-inch guns together, only fired 17 shells; the 11-inch gun being also at the disadvantage of having to pivot from one side to the other when the ship was tacked, to keep the target under fire. In this instance the wind was light, but the swell considerable, so that the ship rolled 7° to 8° and pitched 3°—target distant 800 to 1000 yards.

"4. No difficulty occurred during the cruise in making the 9-inch and 11-inch guns perfectly secure in the roughest sea. Coming from England in October and November, a continuance of boisterous weather, occasionally increased to a gale, afforded the most satisfactory evidence in this respect.

"On the whole, I have no hesitation in affirming that as a pivot-gun, the 11-inch is in every way as manageable as the 64-pounders, which have been so long, and are now used on board our steamers.

"And if this be correct, there should be no objection to

restoring that part of my plan of armament which assigned a tier of 11-inch guns to the spar decks of the screw frigates, for which, too, there may be a more imperative reason in the fact that, until this be done, the ordnance power of those ships will not only be less than what it should be, but even inferior to that of some foreign screw frigates of inferior dimensions. Certainly the present spar deck batteries of the *Merrimac* class are altogether unworthy of being placed there.

"It may be observed, with regard to the retarding influence of the ship's inclination on the heavier ordnance, that in general it is reduced to a *minimum* before going into action, because it is then customary for vessels to diminish their canvas to the least quantity with which the ship can be properly handled. And we may look for a further abatement of the evil to the introduction of steam, which has become a prime necessity to every ship of war in battle. No more sail will then be spread than will be required to give steadiness to the vessel, and the inclination of the decks will be comparatively inconsiderable.

"Again, the opportunities of firing with correct aim are so far delayed by the interposition of smoke and the constant motion of the ships, that it is hardly probable that the heavy cannon now in question will fail to be prepared when those opportunities offer."

The crew of this sloop were all able seamen, and much above the average in education and intelligence; but even with the daily drill on board that vessel, it was found that a few only were capable of being qualified to act as captains of guns.

During the above experimental cruise, the great superiority of steam over sails, in keeping a vessel under

command when practising at a target, was thoroughly demonstrated, and, in the opinion of Captain Dahlgren, no ship of war can henceforward be considered complete if unprovided with this motor, while its assistance more than compensates for an inferior number of guns, if, indeed, it does not confer irresistible advantages over an opponent otherwise equal.

The *Plymouth* (built at Boston in 1843) displayed during her experimental cruise good sailing qualities. She was handy in light winds as well as in fresh gales; she worked well, rolled easily, and her accommodation both for officers and crew is very comfortable. Her strength must have been considerable, and does great credit to her builders, from her having carried, without any apparent strain, in the heaviest weather, a pivot gun, weighing, with its carriage, upwards of 12 tons, on a portion of the deck where, at the time of her construction, it could not possibly have been anticipated that she would have had to carry such a load. The official report adds, that the repeated concussion from so heavy a gun produced no injurious effect upon the ship's frame.

It may not be amiss here to note the opinion, recorded by Captain Dahlgren for the information of his government, of the *Diadem*, more especially on account of the particular reasons which led to the construction of this class of vessel. She is, he states :—

"Registered on the official list as a screw steamship, 32 guns, 300 horse power, and exhibits a finished sample of the larger class of new British screw frigates designed to rate with our *Merrimac* class, being complete in all appointments and commissioned for service.

"She is by no means as large as the *Mersey*, and is even inferior in size to the *Merrimac*, if the dimensions given

by the nautical periodicals are correct—viz., between perpendiculars, 240 feet; breadth, extreme, 48 feet; tonnage, 2500. The gun deck affords fine roomy quarters, even for the massive cannon mounted there. The distance between the ports (nearest sills) being 18 feet, while the size of the ports, like the guns themselves, is extraordinary. The pieces which I saw mounted on this deck were 20 10-inch shell guns of 87 cwt., being in reality the original of our own 10-inch gun adopted from the English in 1841, and yet to be seen playing the part of pivot-guns in the *Mississippi*, *Macedonian*, and *Constellation*. The exterior figure of the English gun has, however, been re-modelled so as to conform to that of the ordnance generally. These guns are mounted on the two-truck Marsilly carriage already described in speaking of the *Excellent's* 68-pounder. It differs from the copy which I made of the original for the 9-inch guns of the new United States frigates in having the rear transom to rest on the deck instead of the brackets, as already explained, while the roller handspike ships a little on one side and the training tackle hooks as much on the other. These carriages are unusually low, which is by no means undesirable if not in conflict with other requirements, and the guns can be elevated 14° or depressed 8°, so ample are the dimensions of the ports. There are no eccentric rear trucks, except in that pair of carriages which is abreast of the hatches, closed by the bulkheads for the convenience of the steam, and where it is probable there might be some embarrassment with the roller handspike, which is, however, the only resort of the 10-inch guns, and is longer and much heavier than our own. On the spar-deck are 10 32-pounders of 53 cwt., mounted and equipped as such guns usually are, and two 68-pounders of 95 cwt., one at each

end. These last are on pivot carriages resembling our own in the general principle only of a carriage moving on a slide, to which it is compressed in recoil. In detail the difference is very considerable; the slide is much shorter, and instead of bolt and socket the connexion with the deck is established by a plate attached to the fore end of the slide, which plays on a hinge, so as to turn down and allow the hole in it to drop over a bolt in the deck, which is so rounded for the purpose that its head resembles that of an acorn. These bolts are placed permanently in the deck wherever it is intended to pivot the slide, and the plate when turned up against the fore end of the slide lies flush with its surface, so as to present no projection. The compresser is applied to the rear transom, the latter being extended underneath from the brackets sufficiently for the purpose, which explains the contact of the transom with the deck instead of the brackets, when the carriage is transferred from its slide to be used in broadside. The fore trucks have fixed axles, the rear act eccentrically by attached levers, to which hook the side tackles. The upper surface of the rail is faced with a wide iron plate. All of these arrangements seemed to me inferior to our own, though this may not appear so markedly with such pieces as 68-pounders.

"The after pivot-gun is stowed athwart the deck, directly forward of the propeller wheel, which is without a trunk, as in our ships, but is closed by a flat hatch flush with the deck-plank when the screw is submerged, so that the slide traverses without obstruction, and enables the gun to command the entire sweep of the stern, which is well opened for that object, and thus half the purpose in having a stern gun is not uselessly sacrificed, as it is in the United States screw-frigates.

* * * * * *

"The *Diadem* is a warlike-looking vessel, ship-rigged, though less heavily masted and sparred than usual.

"The screw is hoisted, not by the spanker boom, but by sheers stepping on the spar deck at each side of the well; the legs are readily separable, and, being short, admit of being conveniently stowed out of the way.

"Two other ships (one building) are styled, on the official list, like the *Diadem*, 'screw steam-ships, 32 guns, 800-horse power,' and I am told are of the same class, but am without any authentic information to that effect.

"Another type of the screw frigate I saw in construction at the Woolwich-yard, named the *Galatea;* but no vessel answering to the name or class appears on the official list. All the frames were up, except a few at the extreme after end. The length was said to be 280 feet, which is about that of the *Diadem;* whether the resemblance extended to the other dimensions I was not informed, but they were certainly those of a large ship. As well as I could distinguish, there were indications of 24 ports on the gun-deck, and I was told that the spar-deck would be light, except at the ends, where it would be made strong enough to bear a heavy pivot gun. If correctly informed, then, there would be 26 guns, all, no doubt, of the heaviest description, as would befit so large a ship; but what they would be my conductor was unable to say.

"These three ships—*Mersey*, *Diadem*, and *Galatea*—may be considered as embodying the views of the British authorities in relation to the types of build preferable for screw frigates of the largest size."

With respect to the British line-of-battle ships, both screw and sailing-vessels of the largest class, many of which he inspected during his sojourn in England, he evidently

looks upon them as a kind of craft all but obsolete, at any rate, so far as his own country is concerned, whose naval policy "would render the construction of such vessels almost useless." He was much struck, however, with the gun-boats, to which he devoted particular attention; the United States Navy being wholly unprovided with them, notwithstanding their peculiar adaptability to the shallow waters of the southern sea-board, where vessels of greater draught would be wholly useless.

Few matters of importance seem to have escaped his practised professional eye. For instance, he noticed that while the decks of all American vessels and of most English ships, until very recently, were formed of pine, those of later British men-of-war are planked with oak from the water-ways to the coamings of the hatchways, to preserve them from the wear and tear of the trucks of heavy gun-carriages, to which ships' decks must inevitably be exposed. He approved, too, of the greater "planeness" of the decks of those ships he saw here (as contrasted with the undulating decks of American vessels); this point being unquestionably an essential where heavy guns are to be used.

It is rumoured, that it is the intention of the Government of the United States to commence ere long the construction of an experimental flotilla of gun-boats, as also of a class of small sloops, provided with light brass 12 and 24-pounders.

Unquestionably the most efficient class of sailing-vessels they now possess are those rated under the denomination of sloops of war; not but that there is considerable room for improvement even in them. The construction of these vessels has usually been left to private builders, and the result has shown no great advantage from en-

trusting that matter to such hands. These vessels, except when undergoing repair, are generally in commission; and it certainly appears that, from some cause or another, they are oftener undergoing reparation than merchant vessels.

It may, perhaps, be objected, that if these vessels carried numerous heavy guns upon their decks, the result would be different: in reality, however, it matters little, whether the burden carried by a ship consists of guns or of heavy merchandize. Many of the merchant vessels, above adverted to, carry between decks an amount equivalent in weight to the batteries of any frigate or corvette. Mr. Griffiths, the great authority on the other side of the Atlantic on the subject of naval architecture, evidently has no high opinion of their general strength, for he asserts, in allusion to the vessels of war of his own country, "that there is no ship in the Navy able to do the work that many merchant ships have done, and still retain her shape, with the same amount of repairs; the reason will appear obvious, if we but consider that the tanks for water and the spaces left for kentledge deprive the ship of a great amount of strength, inasmuch as most of the space occupied by these is filled with heavy bilge strakes, and with sister kelsons; these render the bottom and bilge very strong; the top-sides are not overlooked.

"Very many of our merchant ships have live oak and locust top-timbers and stanchions; and as regards the manner of putting the frames together, are actually stronger than those of the Navy, inasmuch as the distribution of the butts of the timbers is more general. No one in a private yard would think of adhering with any degree of tenacity to the diagonal sirmark for cutting off the head or heel of the timber; it should be remembered

that the greatest amount of strength is obtained from an equal distribution of butts; and with regard to the manner of fastening the ships of the two classes, we deem it rather a detriment than otherwise to extend the fastening of the deck frame through the outside plank, and we are not alone in this matter. It is assumed by those whose province it is to determine how much fastening is required in vessels of war, "that the plank should be square fastened to the timbers throughout; this it must be admitted is enough, and if enough in one part, why not in all?"

It may be requisite here to explain to the uninitiated, that by "square fastening" is meant the use of two bolts, treenails, or spikes in each timber, or four in the frame in each plank. It is obvious that any fastening of whatever kind, more than sufficient, must be an injury, as it not only weakens the plank, but causes an early decay of the timber. The extension and exposure of the deck fastening through the outside plank has long been pointed out as one of the reasons why vessels of the United States Navy rot so much sooner than merchant ships. Another cause may be, the deficient ventilation of these men of war, not to mention the injurious seasoning to which much of the timber employed is subjected. There is in these vessels a large consumption of yellow pine timber, a wood erroneously supposed to require a lengthened period of seasoning. An enormous stock has consequently been maintained on hand by the Government for a great number of years, and it has then been employed both for the construction of new vessels and for repairs, just about the time when it was going to decay. This has been a fatal error; yellow pine requires no more seasoning than can be given in a few months, in order to

ensure its greatest durability. Many merchant vessels built at New York almost exclusively of yellow pine, cut but a few months before it was used, were found to have their original deck-beams, in a perfectly sound state, after the lapse of more than a quarter of a century.

Of the old sailing-ships of the line, little can be reported in their favour. It is recorded, on the authority of an officer who for a considerable period commanded the best ship of this class in the Navy List, that, during a cruise of more than two years, he never could, with a head wind and sea, "get more out of her than six knots per hour," and that she drifted to leeward faster than any vessel he ever saw. Before the wind, she could make tolerable progress; so indeed can a Chinese junk or a Dutch galliot, but that is no evidence of what can be deemed valuable sailing qualities.

The American line-of-battle ships have, for the most part, clumsy lines; from some mistaken motive, much greater capacity for stowage has been given them than necessary. For this reason their buoyancy or want of stability is excessive; perhaps, the best course of treatment they could receive, or at any rate such of them as are worth the outlay, would be, to cut them down, and so relieve them entirely of their spar-deck. The science of naval architecture does not seem as yet to be in a very advanced state in the dockyards of the United States, although the navy-yard at New York, as well as those at Washington and Boston are of considerable extent, and have, not long since, had large sums expended upon them. The former of these is on Long Island, and employs about 500 men. Its dry dock will admit the largest vessels. They may be docked, and a quantity of water amounting to 610,000 cubic feet, pumped out in

four hours and a half, by a powerful engine with a 50-inch cylinder and 12 feet stroke, working two pumps, each 5 feet 3 in diameter, and having an 8 feet stroke. This dock, inclusive of the machinery connected with it, cost little short of half a million sterling.

In the navy-yard at Washington, about 600 men are constantly engaged in the manufacture of marine engines, cables, guns, and anchors. Some pieces of ordnance have been made here of the largest size, capable even of carrying a ball of 240 lbs. weight. A registry is kept at this arsenal of the quality of the metal of which each individual gun is composed, and the date at which it was cast.

The navy-yard at Boston extends over many acres, and contains three large ship-building sheds. One is now used as a store for timber in process of seasoning, another is empty, and in the third the ship *Virginia*, which has already been on the stocks more than twenty years, is slowly advancing towards completion. The rope-walks at this yard are extensive; lengths exceeding 200 fathoms being constantly made in a building 1360 feet long. In this yard is also an ingenious machine for block-making. The lignum vitæ sheaf is bored with precision, and almost simultaneously bushed with brass, with little assistance from the hand of the workman.

In all the various departments, indeed, numerous labour-saving machines are observable, in all of which much ingenuity is evinced. The Americans have long shown an aptitude for originating devices of this kind, but in mechanical skill, those to whom the management of the navy-yards is entrusted, are probably not upon a par with our own or with those of France. They appear, indeed, if we may judge from many of their productions,

to adhere pertinaciously to antiquated views and prejudices long since exploded on this side of the Atlantic. While ship-building for the merchant service has advanced, that art in the yards of the State seems to have remained tolerably stationary. "Are not," exclaims Mr. Griffiths, "many of our frigates models on those of the past century? and are those of the present century superior models to those of the last? Do their performances prove them such? We should not remain in this matter in a state of *eternal childhood*. Unless there be a greater improvement in the sailing qualities of the United States Navy than there has been, commercial enterprise will not only raise the means for the support of commerce, but it will also build the ships that are to protect it."

He proceeds to enumerate their various defects; and testimony coming from so authentic a source cannot but be considered conclusive on the point, as it is not usually the practice of Americans generally, and certainly not of Mr. Griffiths in particular, to speak disparagingly of the productions of that country. Having condemned the want of speed of the United States men-of-war, he adverts to their great lack of strength—to the absence of all diagonal plating across their frames. In proof of their weakness, he has no hesitation in asserting that the form of the greatest transverse sections of many of the larger of these vessels is materially altered from the original mould whenever the ship is under a press of sail with the wind abeam. He attributes this to the effect of the weight of the batteries, and he informs us that when the guns are housed, with their muzzles against the ship's side, so great is the strain, that the water-way seam, may constantly be seen to open. This fact conveys such a notion of weakness and want of durability as would seem

scarcely credible, did the statement emanate from an authority entitled to less consideration.

With regard to the *personnel* of the United States Navy, it possesses at the present time six commanders of squadrons* (flag officers). Besides that on the home station, they possess an experimental squadron on the coast of Brazil, one on the Pacific Ocean, and others in the Mediterranean, in the East Indies, and on the coasts of Africa.

In addition to the three important navy-yards already enumerated at New York, Boston, and Washington, there are six others, at Portsmouth, Philadelphia, Norfolk, Pensacola, Mare Island, Sackett's Harbour, New York. Over each of these nine yards a separate commander presides. The Naval Asylum at Philadelphia has a governor, and the Academy at Annapolis a naval superintendent.

There are at the present moment 75 captains on the active list, 22 on the reserved; 106 commanders on the active list, and 20 on the reserved.

The commanders of squadrons (flag officers) receive 4000 dollars per annum; other captains on duty, 2500; those on furlough, 1250.

The 106 commanders on sea service, and those having the superintendence of the navy-yards or other duty, receive 2100 dollars; when on furlough, 900 only. Lieutenants commanding, of whom there are at present 317, have 1800 dollars per annum; when on furlough, 600. The annual pay of a surgeon of twenty years' standing is 2400 dollars; one of five years, of the fourth class, 2133; of the third class, 1866; of the second, 1600, and of the first, 1333.

Assistant-surgeons, of whom there are 37, after passing

* The rank of Admiral is not known in the United States Navy.

&c., receive at sea 1200 dollars; pursers from 1500 to 3500; and chaplains 1500.

The pay of a past midshipman (there are now but 24 of these on duty) is 750 dollars. Masters of a line-of-battle ship at sea get 1100 dollars; second masters, 750; and masters' mates, 450.

Boatswains, gunners, carpenters, and sailmakers receive alike 900 dollars per annum at sea, 600 when on leave, and 700 when on shore duty. They have an addition of 2 per cent. on these rates for every year's sea service, and an addition of 10 per cent. to their sea pay when serving in ships with 400 men, and of 20 per cent. when serving in ships of 900 men.

Chief engineers receive during the first five years (when on duty) 1500 dollars; after five years, 2000. Assistant engineers of the first-class are paid 1000 dollars; those of the second-class, 800; and of third, 600.

The marine corps has the organization of a brigade. It is subject to the laws and regulations of the Navy, except when by order of the President of the United States it is detached for service with the Army. The head-quarters of the marines are at Washington.

Besides the colonel commandant, and a general staff, composed of an adjutant, paymaster, quartermaster, assistant-quartermaster, lieutenant-colonel, and 4 majors, there are 13 captains, 19 first, and 20 second lieutenants. The number of non-commissioned officers, privates, and musicians averages about 1000 men.

The Navy of Holland is well organized, disciplined, and appointed. It comprises at the present moment 2 ships of the line of 84 guns each, and 3 of 74; 7 first-class frigates (3 of them screws), 54 to 45 guns; 8 second-class

960; 11 smaller vessels; 3 transports; 10 mortar-vessels; and 30 armed with Paixhans' guns: altogether, 98 vessels of all descriptions, with an aggregate horse-power of 6650, and carrying 832 guns.

The King of Naples has in his naval service 2 vice-admirals, 5 rear-admirals, 9 brigadiers, 8 captains of ships of the line, 17 captains of frigates, 30 lieutenants, and 26 midshipmen.

There are 2 battalions of marines, each comprising 6 companies. The marine artillery consists of 14 companies, of 225 men each; 2 companies (stationary) of 131 men; the staff numbering 42. Of seamen there are 104 officers and 800 men.

The Austrian Navy numbers altogether 135 vessels, including pinnaces, gun-boats, yawls, and pontoons. The aggregate number of guns is 852, and of men 8707. But of the above 135 vessels only 6 are steamers—namely, 1 screw ship of the line (launched in April last, and the first ever possessed by Austria)—she is a fine vessel, tolerably well built, mounts 91 guns, has engines of 800 horse-power, and a crew of 900 men; 3 frigates have each engines of 300 horse-power, mount together 93 guns, and their aggregate crews amount to 1125.

The *personnel* of this Navy includes 1 vice-admiral, 2 rear-admirals, 9 captains of ships of the line, 8 captains of frigates, 6 captains of corvettes, 40 lieutenants of ships, 22 of frigates, 48 midshipmen (ship), 46 midshipmen (frigate), and a corps of 119 naval cadets.

The seamen consist of 15 officers and 2962 men.

The corps of naval architects comprises 14 officers and 6 cadets; that of naval engineers numbers 43 men.

The marine artillery is composed of 38 officers, 9 cadets, and 1133 men.

The marines, 1955 strong, are commanded by 57 officers and 27 cadets.

The Portuguese Navy contains 37 vessels, large and small, mounting 362 guns, and employing 2118 men. Of the above, 27 sailing vessels and 5 steamers are in commission, the other 5 in ordinary. Besides these there are two at present on the stocks.

The *personnel* includes 1 vice-admiral, 1 rear-admiral, 4 officers of division, 10 captains of ships of the line, 20 captains of frigates, 30 lieutenant-captains, 50 first, and 100 second lieutenants: altogether 216 officers.

Sardinia owns just now 6 fine steam frigates, 4 sailing ditto; 3 steam and 4 sailing corvettes; 3 steam despatch vessels; 3 steam transports; 1 tug; 4 brigantines: altogether 29 vessels, carrying 136 guns, with crews amounting to 2922 men. The Sardinian Navy is commanded by 1 vice-admiral, 2 rear-admirals, 7 captains of ships of the line, 8 captains of frigates, and 8 captains of corvettes.

The Prussian Navy consists of 2 sailing and 2 steam frigates (1 screw and 1 paddle), and 1 sailing corvette; 1 steam yacht; 1 transport; 3 schooners; 1 steamer; 36 gun-boats; and 6 yawls: altogether 55 vessels of all denominations, with armaments of 265 guns.

Under the head of *personnel* may be classed 90 officers; a corps of 1296 seamen; a battalion of marines 600 strong, commanded by 22 officers.

The Greek Navy contains altogether 26 vessels, mount-

the expense of large vessels and costly engines was incurred with no better result than that of bearing half a dozen guns about."

The earliest attempts to apply steam to the purposes of navigation were not promising, and it required many trials and great perseverance to cope with and surmount the many obstacles that at first presented themselves.

Eighty-five years have elapsed since the earliest attempt was made in France to move a small vessel by means of paddles set in motion by steam. Nine years later, efforts were made upon a similar principle in America; it was not, however, till 1789 that anything like a successful result was gained. Mr. Millar, a native of Dalswinton, in Scotland, is entitled to the credit of the original triumph. The *Charlotte Dundas* was the name of the diminutive and feeble precursor of the *Great Eastern;* she carried one of Watt's engines, and is said to have accomplished some four or five miles an hour.

Some further progress was made in the course of the next dozen years, for in 1802–3 we find a couple of small steamboats actually plying upon the Forth and Clyde Canals.

In the latter year, too, an American of the name of Livingstone, in partnership with Fulton, who is usually looked upon as the progenitor of all steamers, built one of very limited dimensions for the purpose of carrying goods and passengers on the Seine. This boat altogether failed to realize the expectations of its constructors. Fulton soon after returned to America, and having there improved greatly upon his original designs, he turned out a far more creditable production, the *Clermont*, destined to carry passengers from New York to Albany.

About 1815* numerous steamers made their appearance on the Thames, the first having been one that was built in the Clyde, and brought round in the summer of 1813. The Americans have the credit of turning out the first ocean steamer, the *Savannah*, a craft of some 348 tons, launched at New York in 1819. She crossed the Atlantic to Liverpool, without casualty, thence proceeded to St. Petersburg and back to New York, performing each of her voyages under steam alone.

Of the paddle it is unnecessary here to say much, as its application to vessels of war will shortly have become obsolete; and though as a means of propulsion it has,

* The following return is interesting, as showing the rapid progressive increase in the number of British merchant steamers during the 40 years from 1815—1855.

Year.	Vessels.	Tonnage.	Year.	Vessels.	Tonnage.
1815 ...	10 ...	1,633	1836 ...	600 ...	67,969
1816 ...	15 ...	2,612	1837 ...	668 ...	78,288
1817 ...	19 ...	3,950	1838 ...	722 ...	82,716
1818 ...	27 ...	6,441	1839 ...	770 ...	86,731
1819 ...	32 ...	6,657	1840 ...	824 ...	95,807
1820 ...	43 ...	7,243	1841 ...	856 ...	104,845
1821 ...	69 ...	10,534	1842 ...	906 ...	118,930
1822 ...	96 ...	13,125	1843 ...	942 ...	121,456
1823 ...	111 ...	14,153	1844 ...	988 ...	125,675
1824 ...	126 ...	15,739	1845 ...	1012 ...	131,202
1825 ...	168 ...	20,287	1846 ...	1070 ...	144,784
1826 ...	248 ...	28,958	1847 ...	1154 ...	146,557
1827 ...	275 ...	32,490	1848 ...	1253 ...	158,078
1828 ...	293 ...	32,032	1849 ...	1296 ...	167,310
1829 ...	304 ...	32,283	1850 ...	1350 ...	187,631
1830 ...	315 ...	33,444	1851 ...	1386 ...	204,654
[illegible]1831 ...	347 ...	37,445	1852 ...	1414 ...	223,616
[illegible]32 ...	380 ...	41,669	1853 ...	1534 ...	264,336
[illegible]33 ...	415 ...	45,017	1854 ...	1708 ...	326,452
	462 ...	50,735	1855 ...	2010 ...	408,290
	538 ...	60,520			

under certain circumstances, some trifling advantages, they cannot compete with the greater power and compactness of the screw, to say nothing of its comparatively lesser liability to injury in action. Perhaps, however, to many the most certain evidence of its superiority would be found in the tardiness with which it was adopted by the Admiralty, long after its merits had been clearly demonstrated.

It is difficult to determine precisely to whom the credit of originating it is due. Nearly sixty years ago, Dr. Shorter, a mechanic of considerable ingenuity, brought out a plan for moving vessels through the water by means of a circular fan somewhat resembling that of a smoke-jack, and not altogether dissimilar to the earliest form of propeller. But at that time anything in the form of a marine steam-engine was unknown; and as consequently the only power that would have been applicable was human labour, little attention was given to Dr. Shorter's project, for the reason that it had long previously been ascertained that the oar was by far the most advantageous medium for imparting motion to a vessel, if men only are to be employed for the purpose.

About thirty-five years later, Mr. F. P. Smith, who seems by general consent to have had, with Captain Ericsson, the greatest share in overcoming the difficulties that were encountered at the outset with the new apparatus, attained surprising results with some small vessels to which they applied it. One of these, though only of 8 feet beam, and 45 feet long, and drawing not more than 28 or 29 inches, actually towed a barque of 630 tons against a strong tide at a rate of nearly 4·5 knots per hour. She also towed the Lords of the Admiralty in

their barge from Somerset House to Blackwall and back, at an average speed of ten miles per hour.

An ordinary mind might imagine that this practical demonstration of the powers of the screw would have sufficed to overcome even official stolidity. Unluckily the counsels of Noodledom prevailed, as they have so often done before and since, over the teachings of reason when anything really good and great might have been achieved, and, in reply to reiterated applications, Captain Ericsson was curtly informed, and without any reason being assigned, "that their Lordships declined to entertain the project." Lord Minto at that time was the First Lord, and his coadjutors were Rear-Admiral Adam, K.C.B., Rear-Admiral Parker, K.C.B., Captain Elliot, C.B., Captain Sir Edward Troubridge, Bart., and Lord Dalmeny.

Two years later, the value of the invention having meanwhile been severely tested in various ways, and its value confirmed, an American who had attentively studied the subject brought out a modification of Smith's and Ericsson's propeller, fitted to a vessel called the *Robert Stockton*. But he fared no better with the Admiralty than his predecessors in the same cause. After receiving negative intimations in considerable number, the applicant departed in disgust to his own country, where he was destined to meet with a very different reception.

It is usual to declaim against the authorities at Whitehall, on account of the preponderance of civilians in the councils there; but this at least is an instance proving that the absence of common-sense views is not always attributable to that cause. Here was a Board, constituted almost exclusively of experienced naval men, obstinately rejecting for years together an invention which any man

of average capacity, not blinded by inveterate prejudice, must have foreseen was precisely, as events have since indisputably proved it, the most important that could be devised for rendering steam power available to ships of war without interfering with their fighting qualities or general efficiency as sailing vessels. The objections to the paddle had long been noted, for they were obvious. In addition to the ungainly and unsightly paddle-boxes, with their ponderous sponsons, diminishing, as they inevitably did, the number of guns in either broadside, while exposing an enormous surface to the wind, and adding materially to the deck-hamper, the most important part of the engines, and more than half the paddles, were necessarily unprotected during an engagement; and as most of the paddle-steamers at that time in the service were miserable sailers, a disabled vessel would have been pretty certain of being captured. Yet, with all this clearly and palpably before them, our synod of incapables came to a decision which would have disgraced a conclave of bum-boat women, had the question been submitted to them, with the whole of the facts of which the Admiralty were cognizant. But so it is, and so it has ever been; "not once or twice" only, in our old "island story." The highest interests of the country have been sacrificed over and again to the prejudice, fatuity, or imbecility of those in whom the public confidence has been so lamentably misplaced. So far from any injury having accrued from external interference, it has happened in numerous instances that the introduction of great improvements has been suggested by civilians, and, however unquestionable the merit of the proposal, its rejection has been over and again occasioned by official indolence, ignorance, or petty professional jealousy. It is rarely,

except under compulsion, that the authorities in any department in this country can be made to act. To persuasion, to reason, nay, to absolute proof, they are nearly always deaf and blind. To pressure from without they can oppose but a feeble resistance, and in this way it is that most measures of any great account are carried. This policy is the natural result of incapacity; and one among its ultimate consequences is, that the country is prevented from maintaining its pre-eminence among nations, except under great disadvantages. There is no need for the adoption of every crude notion that may be advanced by sanguine inventors; but, when a discovery promises a reasonable chance of accomplishing a desirable and most important end, it is incumbent upon the heads of any department under whose cognizance it may fall, to examine it carefully and critically, and not to reject it without having first bestowed upon it the most careful consideration. And still more is it their duty to do so after the most satisfactory proofs have been afforded of its successful achievements.

What blunders, mishaps, and disasters, what wasteful expenditure, what consumption of human life, might have been spared were but a little common-sense and alertness occasionally evinced by our officials, instead of that hostile spirit—the result of routine and prejudice—with which they systematically discourage the communication of valuable discoveries.

But, to return to our sketch of the progress of the screw. As far back as 1840, shipowners, fully alive to their own interests, were negotiating for the purchase of the patent. The *Archimedes*, a vessel of between 200 and 300 tons, and with an engine of 80 horse power, was launched in that year. She succeeded in every respect,

and from that time, the ultimate triumph of this mode of propulsion might have been deemed certain. Even the Admiralty were reluctantly compelled to endorse the opinion, now almost universally expressed, on the subject, and at last ordered the *Rattler* to be constructed. She was a tolerably close copy of the *Alecto*, a small sloop of 5 guns, 200 horse power, and 800 tons, launched the previous year. Her achievements, in competition with vessels of similar and, indeed, of greater horse power, led to the construction of several others. But, from lack of experience at that time of the true principle on which the screw operated, the form of the afterpart of the hulls of most of them were erroneous; and their alteration, when the blunder was discovered, occasioned a prodigious outlay of money. Screw-vessels of large dimensions were now being rapidly turned out from all the principal building yards; and within a few years, the *Bengal*, of 2250 tons, the *Simla*, of 2000, the *Colombo*, of 1900, the *Himalaya*, of 3500, the *Nubia*, *Pera*, and the *Candia*, each of 2200 tons; besides the *Formosa*, *Chusan*, *Bombay*, and *Madras*, and several other small craft, were completed for the Peninsular and Oriental Company, and several paddle-steamers of large size were altered so as to receive the screw.

Among the advantages of the screw over the paddle for merchant steamers, may be enumerated, economy of construction, diminished space occupied by machinery, and great decrease in the consumption of fuel. Mr. Murray, however (the Surveyor to the Board of Trade), in an excellent little treatise on "Marine Engines," questions whether the large screw-steamers, which have for several years proved so eminently successful in the Mediterranean, would excel or even equal such full-powered paddle-steamers as the *Persia* and *Atrato* in the long rolling

swell and tempestuous waves of the Atlantic; and he instances the fact that the new steamers on the West India and Cunard lines continue to be built on the old principle, to show that the Directors are not satisfied that the gain by the change would counterbalance the chance of greater disadvantages. Be that as it may, there is little doubt, from the reasons already given, that, whether for full-powered war-steamers, or those provided with auxiliary propellers only, the screw is far superior to the paddle.

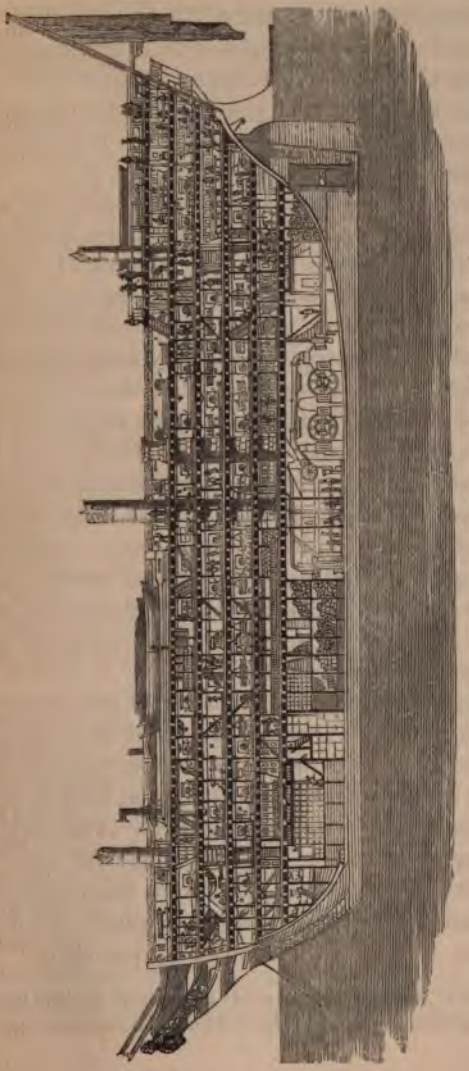
Where steam is intended to be used as an auxiliary, if not as the main agent, and to be resorted to chiefly when the wind fails, or is adverse, the screw offers the only mode as yet devised for rendering it available. In the first place, its arrangements do not require any material alteration in the rig of a ship; secondly, whatever may be the amount of immersion, the screw acts equally well. A paddle-steamer, on the other hand, if her coal be consumed, must necessarily be an indifferent sailer, under the most favourable circumstances, and could hardly be made to beat to windward at all.

Many variations of the form of the propeller, the pitch of the screw, the number of the blades, &c., have been proposed by different inventors. Ericsson's consisted of six or more blades fixed obliquely, so as to form altogether the segment of a screw (about the distance of their own width apart) on the outer circumference of a short cylinder, which is rigidly connected with the engine shaft. It possesses considerable power, and though not so much in vogue here as upon the Continent and in America, it has been extensively adopted. The chief objection to it is, that it cannot readily be removed when it is desirable that the ship should be put under canvas

would be gladly welcomed by naval men. The annexed sectional diagram of a first-rate line-of-battle ship exhibits the position of the engines, propeller, &c.

A number of experiments have been undertaken at different times, at Woolwich and elsewhere, to determine the various essential points connected with the area, length, and pitch of the screw. From some trials made with great care, as far back as 1845, with what are termed double-threaded Archimedean screws, it was concluded that, for a vessel of 165 tons and 100 horse power, the best propeller of the above kind was one 5 ft. 8 in. in diameter, with an area of 13 square feet, and a pitch of 8 ft., the width of the segment being 18 in. But, singularly enough, it was discovered that, when the screw had been reduced in length to 1 ft., and its area to rather less than 9 ft., the velocity of the vessel was hardly at all diminished. It may here, perhaps, be not inappropriately observed, that, from the result of a long series of observations, it has been found that, under all circumstances, the speed of a vessel driven by steam power increases, or diminishes, in a ratio precisely proportionate to the cube root of the power employed, or of the quantity of fuel burnt.

The mode of estimating the power of engines by reference to that of horses, though universally adopted and practically intelligible enough, is not so satisfactory as might be desired. By a horse power is meant the capacity for raising 33,000 pounds (or rather more than 10 tons) weight one foot high per minute. In order to determine the capacity of an engine, it is necessary, in the first instance, to calculate the average weight pressing upon the piston, and, secondly, the distance per minute through which it moves. If we multiply the pressure of steam (as shown by the "indicator") on each square inch of the piston by its



SECTIONAL PLAN OF A FIRST-RATE SCREW LINE-OF-BATTLE SHIP.

area, the product will represent the first quantity. The second is obtained by multiplying twice the length of the stroke, by their number per minute. Then (33,000 × 1 ft. high per minute): (total pressure in lbs. on piston) × (velocity of piston in feet per minute) :: 1 horse power: horse power of engine in question.

The useful effect of any engine is expressed by a fraction denoting the amount of work accomplished, compared with the power employed, represented by unity. Thus, supposing the work to be $\frac{3}{4}$, $\frac{1}{4}$ may be considered as the loss by friction. The consumption of fuel* in the best English marine engines is usually computed at 7 lbs. per hour for every horse power; but the author, in the course of numerous experiments on the subject, has generally found it average as much as 8·23 lbs. per hour. Increased power, or, in other words, increased consumption of coal, is required in a duplicate ratio to any increase of speed. In the merchant service, rapid transit being a great desideratum, the enormous increase of cost which it occasions is generally amply repaid; but in the Navy a high rate of speed is not so essential, except under particular emergencies.

During the construction of the gun-boats, to meet the requirements of the Russian war, and after several of them had been built upon one uniform pattern, it was resolved by the authorities to attempt at least to produce a superior class of vessel of this kind. The engines of these new boats were of considerably greater power than those of the former boats. They were fitted with trunks for elevating the propeller, so as to enable the boat to undertake a long voyage under canvas alone. They

* A ton of coals will occupy nearly 50 cubic feet. The weight of marine engines, boilers, &c., is about 14 cwt. for each horse power.

were rigged for this purpose as three-masted fore-topsail schooners, showing much more canvas than the former boats. Under sail, however, they were found so deficient in stability as to require bilge pieces about 2 ft. wide and 80 ft. long, and set at an angle of 45 degrees to the horizon, not only to check their excessive rolling, but in order to enable them the better to withstand the recoil of their heavy guns when fired athwartships. Four only of these have as yet been tried, namely, the *Slaney*, the *Algerine*, the *Leven*, and the *Lee*. Under the able and skilful management of their respective commanders, Lieutenants Wynniatt, Arthur, Hudson, and Jones, they safely accomplished, under sail alone, the long voyage of the Cape and athwart the Indian Ocean to China. No one but a sailor can appreciate the difficulty of such an undertaking, which redounds greatly to the credit both of the officers and men engaged in their daring and perilous enterprise.

When steaming steadily in moderate weather at the rate of seven and three-quarter knots per hour, the consumption of Welsh coal was half a ton per hour, the screw moving at the rate of 130 revolutions per minute. Steaming at that rate, they can stow four days', that is, 50 tons of fuel. This will carry them 750 nautical miles.

These vessels are 125 feet long between perpendiculars, 132 feet over all; their extreme breadth of beam 22 feet; deep load draught 8 feet 3 inches; greatest immersed transverse section at 7 feet 9 inches; mean draught 142 square feet. The engines, 80 horse power, have each three boilers and two 18-inch cylinders, with 18-inch stroke of piston.

The screws are 6 feet 6 inches in diameter, with a pitch of 8 feet. With the engines working to 316 horse power,

and with an effective pressure of 42 lbs. on each square inch of the piston, the screw making 161 revolutions, the speed attained in smooth water was 9·27 knots per hour.

Well made, however, as the machinery of these gun-boats was, and by the best makers, both engines and boilers are constantly getting out of order, owing no doubt, in a great measure, to the excessive velocity of the screw. The fifteen gun-boats employed in the late Chinese war constantly kept two large steam factories (one afloat and one ashore) at work in executing their repairs; therefore until some more durable machinery can be devised, these vessels can hardly be considered available except for temporary emergencies in hostile operations upon an enemy's coast.

A slight alteration in the form of a vessel often exercises a material influence in the speed attainable. The lines of a screw-vessel must be kept as fine as practicable *aft;* though this was not discovered in the early days of the propeller. It has now been practically proved, however, that a great diminution of "slip," and an increase, amounting in some instances to several knots per hour, has been gained by fining away the lines towards the stern-post.

The *Teazer*, a small screw gun-vessel with engines of 80 horse power, when first launched, could not accomplish six and a half knots per hour with her engines working at more than double their nominal power. The cause of her failure being suspected, she was docked, and underwent a material alteration towards the stern. The result was, that with engines working at little more than 125 horse power she attained a speed of nearly seven and three-quarter knots. Upon making experimentally an alteration of an opposite nature with another small steamer (the *Dwarf*) of 20 horse power, her rate through

the water was diminished to the extent of one half. To ascertain the effect of a sharp, as compared with a bluff bow, the *Magnet* (tender to *Pembroke*, with engines of 60 horse power) originally had a bow forming an angle of 42 degrees; at that time her utmost speed was ten knots per hour; but, with the angle of her bow reduced to 23 degrees, everything else remaining the same, there was a net gain of one and three-quarter knots per hour.

The *Rifleman* (200 horse power) has had her share of alterations. As first turned out, her engines working to 350 horse power, and screw revolving at its greatest speed, the moderate speed of eight knots was recorded. With a new and improved "run" aft, there was a gain of about a knot per hour.

The screw gun-vessel, *Flying Fish*, 350 horse power, by being lengthened eighteen feet forward, had her speed improved to the extent of a knot per hour when going under full power. For it is only at high velocities that a fine "entrance" appears to be of much advantage. In the particular instance of the *Flying Fish*, previously to the alteration above described, the effect of doubling the steam power only augmented the speed to the extent of a little more than a knot and a half per hour; while, after receiving her protracted bow, the speed was accelerated nearly two knots and a half. The trim of a screw—as indeed that of every vessel—materially affects her speed; not so, however, an elongation, even to a material extent, amidships; proving, to use Mr. Murray's words, "that the retarding action of friction between the water and the straight part of the sides and bottom of a vessel, is comparatively unimportant, the main point being the opening and closing of the water at the bow and stern."

Considerable judgment is requisite to regulate the

amount of fuel that should be consumed by a steamer in order to obtain the greatest amount of work from a stated expenditure. In ordinary weather a given quantity of coals will impel a vessel further, if only a moderate portion of her power be used. The lower the rate of speed, the greater the economy of coal, if at the same time regard be had that no steam is wasted. Should she, however, have to contend with strong head winds or currents, the engines must of course be worked so as not only to overcome the adverse influence, but to send her ahead.

In making way against a current, the most advantageous consumption of fuel is found to be that which gives the vessel a rate fifty per cent. stronger than that of the stream the vessel has to stem. For instance, if the current flow at the rate of six knots per hour, the ship should be made to advance at a rate of not less than nine. Theoretically, indeed, the power consumed in driving a vessel through the water, as has been already stated, fluctuates with the cube of the velocity; but practically, the weight of the engines and coal, causing an increased resisting surface, tends to augment the power actually required, to a somewhat greater extent than would seem to be required under the above formula. The utmost speed of a steamer must depend upon the weight of the engines and amount of coal she is capable of carrying. The weight of the former (per horse power) diminishes as the dimensions increase, at the same time that the "work done" by the steam is proportionately greater.

The sails of a screw-steamer can of course frequently be made available to aid the engines, though they are not perhaps set quite as often as might be desired; but it is

plain, that even when the engines are at work, whatever speed is given to the vessel by her sails, is so much saved of the demand upon the bunkers, no trifling consideration in remote seas and where coal can only be procured at great cost. Her Majesty's ships ought undoubtedly to be built with a view to the attainment of the highest possible speed compatible with other and more important qualities; at the same time, it must be borne in mind, it is only upon particular occasions that these vessels are required to be worked at anything like their full power, unless we except despatch-boats, mail-vessels, and small craft of different descriptions. The object of every commander should be, by a judicious use of steam and sails, to keep up continuously a moderate rate, and to economize his coal as much as possible, only burning it freely, in fact, when such a consumption is unavoidable.

On board some French Government vessels, more especially those employed in the Mediterranean, this principle seems hardly yet to be sufficiently attended to, if we may judge from the quantity of coal they are reported to consume, and the dense trails of smoke they ordinarily leave behind. That, indeed, is an invariable sign of wasteful expenditure, arising either from bad fuel, defective furnaces, or incompetent stokers and engineers. There is not the slightest excuse for the continuance of this egregious absurdity. A comparatively simple alteration in the flue arrangements will entirely obviate not only the loss, but at the same time the nuisance it occasions, while even with the worst description of furnace much can be done by feeding it regularly and properly.

Any notice, however cursory, of steam navigation, or indeed of steam engines, would justly be deemed im-

perfect if it made no mention and gave no explanation of what has been termed the "expansive principle." By means of this important modern improvement a great economy is effected in the quantity of steam employed to accomplish a certain amount of work, and consequently there is a very material saving in fuel. Under the old system the communication between the boiler and the cylinder was kept open during the whole time that the piston was making either its ascending or descending stroke. This is not the case when an engine is worked "expansively." The steam is then cut off when the piston has made a portion—say two or three-fifths of its stroke—the quantity of steam at that time in the cylinder being suffered to expand and complete the stroke.

The mechanism requisite to accomplish this is simple enough, all that is needed being a graduated "cam" on the shaft, against which a roller is made to press, communicating, through a series of levers, the requisite movement to the expansion-valve, the position of which is between the slides and the throttle-valve.

Before dismissing this portion of our subject, it may not be irrelevant to say a few words on the subject of super-heated steam, or steam the temperature of which is raised after it has left the boiler. The patentee, Mr. Wethered, states: "That if a certain quantity of saturated or common steam be withdrawn from the boiler and heated out of contact with water to a high abnormal temperature, then *mixed* with a certain quantity of saturated steam, and if this 'mixture' be used to actuate the engine, a greater power can be derived from it with a given weight of fuel than could be derived from the use of saturated steam alone, generated by the same weight of fuel."

The heat is imparted to this steam by making it circulate round the base of the funnel, where it absorbs as much caloric as possible; being then mingled with common steam drawn directly from the steam chest, it is admitted through the valves into the cylinders.

Numerous experiments, tried both in this country and in America, satisfactorily show that considerable increase of power is gained by this means, without a greater consumption of fuel. In one instance (in America), where the marine boiler of a model (12 horse power) engine was used, the "units of work" effected by one pound of coal were stated to be as follows:—

When working with	common steam	alone	790·0
„	surcharged	ditto	1302·8
„	combined	ditto	1625·3

Assuming the observations to be carefully recorded and the report faithful, this would show an advantage to the extent of 106 per cent. by using this potent "mixture."

In another trial on board a tug, on the river Hudson, the gain was calculated to be 72·69 per cent., while the average of a further series of experiments only exhibited "the economical efficiency of the combined steam as 33·51 per cent. greater than that of the common steam alone." The explanation given of the great discrepancy here apparent is, that for particular reasons the fires had to be kept "so low, that they burnt into holes on the bars, and cooled the flues."

The French have experimented a good deal with superheated steam, and the conclusion to which a commission appointed to investigate the subject arrived was:—

"1st. That the use of super-heated steam, compared with ordinary steam, reduces the expense of fuel from

19·2 to 12·5, that is to say, in the proportion of 100 to 65·1.

"2ndly. The use of super-heated steam, mixed with ordinary steam, compared with super-heated steam alone, reduces the expense of fuel from 12·5 to 9·1; that is to say, in the proportion of 100 to 76·8; and compared with the use of ordinary steam alone, gives a profit of 52·7 for 100."

About three years since, the Admiralty directed the *Black Eagle* yacht (260 horse power), as also the paddle-wheel troop-ship *Dee* (200 horse power), to be fitted with Mr. Wethered's apparatus. Mixed steam at a temperature of about 300° being employed on board each vessel.

The economy of fuel on board the *Black Eagle*, as shown by a series of careful experiments, amounted to 18 per cent., and on board the *Dee* to 31 per cent. There is a wide discrepancy between the English, French, and American results; still it would seem that the subject is an important one, and merits perhaps more thorough investigation than it has yet received.

The more defective the boiler with which trials are made, the greater will be the apparent advantages resulting from the use of super-heated steam—the increased power in that case being clearly derived from the particles of water held mechanically in suspension in the *wet steam* coming from the boiler, the heat used for the purpose being that which would otherwise be lost by passing up the funnel.

To explain the term *wet steam* it may be necessary here perhaps to observe, that pure steam is as perfectly devoid of moisture as it is invisible; it is only when condensed, and in process again of conversion into water, that it becomes visible and generates moisture.

With properly constructed boilers the steam, as it passes through the steam-chest to the engine, should be wholly devoid of water.

Perhaps the most striking results from the employment of super-heated steam were those recently attained from its adoption on board the *Valetta*, a steamer belonging to the Peninsular and Oriental Company. The *Valetta* was, as is well known, one of the fastest mail boats in their service, and for many years was employed upon the line between Marseilles, Malta, and Constantinople. Her engines were originally of 400 horse power, and, when working at the average rate of 15 miles an hour, her consumption of fuel was often as much as 74 tons per day—never less than 45. With a desire to reduce the heavy current expenses of this vessel, the company determined to take out her engines, put them into a larger ship, replacing them on board the *Valetta* by engines of 260 horse power, applying to them super-heated steam.

On the trial trip of this vessel, on the 21st of April last, with her new machinery, the steam employed being heated to 350° instead of 250°, the speed attained with a very small comparative consumption of coal was 14·42 knots per hour; thus accomplishing as great a rate as had been previously gained with engines of nearly double the power of those at present employed.

It is calculated that the daily saving of fuel on board this vessel alone, will be from forty-five to fifty tons; no inconsiderable economy, when it is considered that the price of coal in the Mediterranean is often above 40*s.*, and seldom below 30*s.* per ton, and that the annual coal bill of the company exceeds 670,000*l*

It is earnestly to be hoped that the attention of the Admiralty may be again seriously directed to a further

consideration of this very important subject; the results last mentioned being most satisfactory in every way, if not conclusive on the matter. It must be borne in mind, too, that the primary expense of adopting the super-heated process is comparatively small, while the annual diminution of outgoings would show a very manifest reduction in the expenditure of the Navy, adding at the same time, as it unquestionably would, to the value and efficiency of each war steamer, by enabling her to carry so many more days' fuel without any increased dimensions of bunkers.

A more important improvement has scarcely been suggested since the first introduction of steam as a motive power on board ship.

As has been already elsewhere stated, the French Government, before applying the screw generally to the vessels of their Navy, watched with attention the progress of the new invention in this country. They were thus saved the necessity of experimenting on a gigantic scale at their own cost; but they have since tried many varieties of the screw, in order to determine not only the best form, but the best "pitch."

In the summer of 1858 some interesting experiments were tried at Brest, on board the *Austerlitz*, 90. She was launched in 1852—has an auxiliary screw, worked with engines of 500 horse power. The chief object on the above occasion was to test practically the value of an improved form of screw invented by Lieutenant Vergne, of the French Navy. The propeller proposed by that officer was cast with a series of projecting wings, set at a particular angle on the inner side of its curve. The advantage of this modification was found to be a gain in the speed of the vessel of 1·7 knots per hour, to 4·2 instead

of 40 revolutions per minute, together with the abolition of all vibration. Nor did the increased revolutions of the shaft produce any heated bearings. It is therefore probable that this invention may before long be adopted, as the naval authorities of France, unlike those of some other countries, readily encourage the introduction of any improvement that can be shown to be attended with concomitant advantages.

From America it does not seem at present probable that we are likely to receive many valuable hints on the subject of the screw; they appear for the present, at least, to be somewhat behind the rest of the world in the use of this particular mode of propulsion.

Mr. Griffiths, already quoted, when instituting a comparison between the two modes of applying steam power to steam men-of-war, gives an unqualified opinion in favour of the paddle, "inasmuch," says he, "as the gearing necessary to obtain the required speed of the screw adds to the risk, and renders this mode of propulsion more liable to derangement than a more direct application, which the side paddle-wheel is recognised to be. This, in connexion with the ready manner in which the side wheel can be repaired, renders it preferable."

It need hardly be necessary to remind the English reader that this opinion is diametrically at variance with facts; and as it is one authoritatively pronounced, in what is in some respects justly considered one of the most important publications on the subject of which it treats—"Marine and Naval architecture"—we may perhaps regard the above as a tolerably correct exposition of the views of ship-builders generally in the United States.

The aggregate horse power of the engines belonging to

the English Navy in 1852* was 44,482; of those in the French Navy, 27,240. Since then, England and France have been increasing their steam Navies at about an equal rate. England, consequently, has not at present the same relative superiority over France which she then possessed. By January, 1860, taking into account the engines now constructing in both countries, 55,030 horse power will have been added to the English Navy in the eight preceding years; 54,804 to the French; showing an increase in favour of England of 226 horse power only within this period. Of the increase to the English Navy, 18,700 horse power has been on account of line-of-battle ships; to the French Navy 24,640, and 3600 for the iron-sided frigates; altogether 28,240, or nearly 10,000 horse power more than the increase to the English Navy as respects this description of vessels: 7793 has been added to the horse power of engines for frigates and block-ships (English); 13,100 for frigates (French). The total addition to the horse power of engines for line-of-battle ships and frigates since 1852 has been as follows, although since 1855 there has not been a single line-of-battle ship laid down in France, nor has there been one three-decker on the stocks since then :—

England	26,493
France	41,340
Difference in favour of France in the period	14,847

Since 1852, then, France has added considerably more than England to the horse power of engines of the more powerful classes of vessels.

* Great efforts were made by our Admiralty for several years before 1852 to increase the horse power of marine engines. In 1851 the expenditure for steam-engines did not amount to 100,000*l.* In 1852 it exceeded 200,000*l.*; in the last six years a total of 3,423,021*l.* has been expended, giving an average of 570,503*l.* a year.

On the other hand, England has added 15,073 in excess of France to the horse power of engines for vessels below the rank of frigates—viz.,

England (including 8690 for gun-boats) . .	28,537
France (including 2240 for gun-boats) . . .	13,464
Difference in favour of England in the period	15,073

By the end of this year (1859) the collective horse power of the whole Navy* of England will be 99,512; of France 82,044.

So far from maintaining, as many writers have done, that steam, in revolutionizing naval warfare, is likely to place all nations for the future upon a par, the French freely admit that England, in consequence of her almost unlimited supply of coal, has manifest advantages over other countries.

M. MacSheehy, who has written a good deal upon this topic, observes: "Je dirai donc que la marine à vapeur qui semblait devoir favoriser toutes les nations qui ont une grande puissance, mais dont la population fournit peu de ressources pour le service de la mer, se trouve, par suite de sa richesse en charbon, être bien plus avantageuse à l'Angleterre qu'à tout autre Etat de l'Europe; mais aussi en aplanissant d'une manière absolue le chemin de la mer, elle a détruit la barrière qui rendait cette contrée inattaquable, et a ouvert en quelque sorte dans ses frontières une brèche qui s'agrandira tous les jours." This sentence comprises pretty much all that can be said upon the matter. The greater part of the coal now used in the French Navy is purchased from Newcastle and

* The number of steam-ships and vessels has increased from 177 in 1852 to 464 in 1858; the tonnage from 182,562 to 457,881; the guns from 3,045 to 8,246.

Cardiff; a mixture of the North country and of the Welsh being found to answer much better than French coal only; and even at Toulon, not many miles from the mines of Grand Combe, though it costs 34 or 35 francs per ton, and while the French coal is much less than half that price, British coal is used on board all war steamers. At the same time our Admiralty can obtain the best coal at the home ports readily at from 11 to 18 shillings. The article of fuel becomes now-a-days an important consideration in estimating the cost of a fleet, where the consumption of many of the larger vessels not unfrequently exceeds 100 tons per day. Notwithstanding, too, the enormous stores at the different French dockyards, in the event of any war, much less one with England, the price would soon be materially enhanced; this was seen, in some measure, during the Russian war in 1854–55, when the French Government found it preferable to pay 75 or 80 francs per ton for Welsh coal, to making shift with their own. So little coal, available for marine engines, is found in France, that, should hostilities occur between the two countries, and continue any length of time, the dearth of fuel would greatly cripple the operations of the French Navy, which would then become for the most part dependent upon supplies from Belgium.

It has been ascertained from experiments carefully conducted, that French marine engines consume, when working to their full extent, 100 kilogrammes* per hour for each horse power; but as they are seldom worked, except in cases of emergency, at more than half power, the fuel is proportionably economized. A squadron, therefore, of ten vessels, each of 900 horse-power, going at half speed, under steam, would burn about 900 tons between Toulon

* A kilogramme = 2.2046 lbs. avoirdupois.

and Algiers, and rather more than 5000 tons between Toulon and Brest. An idea may hence be formed of the enormous expense of a large fleet for this article alone, or even the cost of a few ordinary evolutions. But the application of steam to the entire Navy of every first-rate Power is now assumed as a fundamental condition of its strength; a plentiful supply of the particular quality of coal requisite for marine purposes will, therefore, henceforward be a matter of vital consequence. During the very important inquiries instituted, under the Commission of the French Government in 1849, all the officers examined, gave it as their unanimous opinion that, as machinery was then made, French men-of-war could only keep the sea in foul weather with the assistance of coal imported from foreign countries. In a voyage undertaken for the purpose, it was found that in the same vessel, and under circumstances almost identical, proceeding at the same rate through the water, the consumption of British fuel was 13,000 kilogrammes, yielding 12 hectolitres of ashes, while the consumption of French coal was 17,000 kilogrammes, producing 23 hectolitres of ashes. It is, however, neither impossible nor improbable that in process of time, some means may be discovered of adapting the furnaces of French marine boilers to the fuel of that country. But, even then, the distance of the mines from the various ports must, for some time at least, place the French at a great disadvantage, should they ever be dependent upon their home supplies. As it is, a reserve of one year's consumption is kept on hand, to guard against contingencies.

NORTH
CASTIGNEAU
FORT St LOUIS
LESSER ROADSTEAD
TOULON.

occasion his Lordship himself took the helm of the leading fireship, loaded as she was with 1400 barrels of powder, 380 shells, and an enormous mass of combustibles, passing unscathed through the converging fire of 900 guns, thus achieving one of the most daring exploits of the kind ever attempted either in ancient or in modern warfare.

TOULON*

May be deemed the second Naval port of France. Its position is naturally very strong, standing as it does in the hollow formed by a deep bay, in which are the outer and the inner roadsteads. Behind it, to the northward, rise, tier upon tier, a range of rocky heights, on which, wherever a fort could be posted or a battery erected, guns have been placed in position, almost to the summit of Mont Faron, 1700 feet above the sea level. Two small promontories divide the roadsteads, each bearing on its extremity a fort of no mean strength, the cross-fire from which would cut up any hostile vessel that might attempt to enter. The port itself is subdivided by two moles, into what are termed the Nouvelle Darse,† or Naval port (covering 55 acres), and the Ancienne Darse, or merchant harbour, somewhat larger. This last is bounded along the whole of its north-eastern side by a quay, upon which are daily discharged cargoes of corn and other produce from all parts of the Mediterranean and Levant.

Beyond these, to the westward, is the new arsenal of Castigneau, with its steam factory, docks, building slips,

* Toulon—*Observatory:* lat. N. 43° 7′ 5″; long. W. 5° 56′.

† The term Darse means that portion of a maritime town or station nearest the sea.

England.

	Dockyard area.	Slips.	Docks.	Docks building.
	Acres.	*Number.*	*Number.*	*Number.*
Deptford	38	5	2	0
Woolwich	56	6	3	0
Chatham	95	8	4	0
(*St. Mary's Island, &c., 284 acres)	0	0	0	0
Sheerness	57	1	5	0
Portsmouth	115	5	9	1
Devonport	71	6	5	0
Keyham	73	0	3	0
Pembroke	77	13	1	0
Total	582	44	32	1

France.

	Dockyard area.	Slips.	Slips building.	Docks.	Docks building.
	Acres.	*Number.*	*Number.*	*Number.*	*Number.*
Cherbourg	256	12	0	7	...
Brest	131	12	0	4	...
L'Orient	106	16	2	1	...
Rochefort	132	13	1	2	...
Toulon	240	20	0	3	..
Total	865	73	3	17	...

For the reason stated in the foot-note below, difficult, without further data, to say what is the extent of the dockyards of France, but if we a 83 acres to be approximately the aggregate area whole of the gun-wharves, &c., at the five ports—a probably rather in excess of, than under the

* This island adjoins Chatham Dockyard, but being at unappropriated, cannot fairly be considered any part of the dc although the Surveyor of the Admiralty, in a Report recen lished, has thought proper to include it, apparently with a make as good a show as the French. He might almost as rea have annexed, in a similar manner, Southsea Common to Port Dockyard! In the French computations the gun-wharves and ling yards are added in, these are not reckoned in the English sta

quantity—we still find the superficial area of our own to be 200 acres *less* than those of our neighbours. Again, they will shortly have 76 building slips as compared to our 44, while our docks number 34 to their 24.

Out of the 44 English slips now in use, only 9 are adapted for modern first-rates, while of the 32 completed docks, no less than 28 are incapable of receiving ships of the largest classes. Several, then, both of the slips and docks must be extended in order to keep pace with the growing exigencies of the Navy. However much, therefore, the mistaken policy of past times is to be regretted, little surprise can be experienced at the unpalatable fact that an unavoidably heavy expenditure has to be met during the present year. Thus, under the head of "New works," 585,862*l.* is now required, as against 265,140*l.* in 1852. This year, the comprehensive item of "Stores" absorbs 1,480,000*l.*, or 100,000*l.* more than last year. In 1855 and 1856 1,250,000*l.* went for steam-engines alone; in 1857, 345,000*l.*; and in 1858, 300,000*l.* This year 250,000*l.* will be disbursed for machinery; the average for the last six years having been 570,503*l.* annually. It is thus evident, that in order to uphold the supremacy of England at sea, there can be no diminution for a long while in the above charges, and others of a similar character. Steam has much of this to answer for, to say nothing of the necessity of keeping ahead of our neighbours in all our preparations for ocean warfare. Every other vote in the estimates is materially affected by the one which fixes the number of men to be employed, more especially does it augment or diminish the demand for stores, wages of artificers, as well as the wear and tear of ships at sea.

The larger number of ships in commission of late, as contrasted with former years, has caused an increased

consumption of timber for repairs, for spars, gear, sails, rigging, &c., to make good casualties. With the growing size and strength of ships,* it is obvious, too, that the augmentation of cost must be considerable, while steam propulsion must be attended with the constant repair of machinery, the replacement of boilers, and last, but not least, the consumption of fuel,—at the home ports a heavy, but on foreign stations a still more serious item of disbursement.

Marine engines have called into existence long ranges of steam factories.† The expense of the buildings themselves may be defrayed by the votes of some three or four consecutive years, but it must be remembered, that when once in being, they have to be maintained and provided for indefinitely.

As regards the stores of timber, spars, tar, coals, &c., recently on hand at our eight yards, the computed quantity will be seen in the second column in the subjoined table. The numbers naturally show a considerable increase on the several amounts for 1852.

Statement of the Quantities of the following Articles in Store at the various English Dockyards.

		1852.		1858.
Timber, English and foreign oak . .	Loads	55,117	...	65,988
Hand-masts, of sizes	No.	4,953	...	7,907
Norway spars	No.	15,731	...	21,385
Elm timber	Loads	4,503	...	5,691
Hammocks	No.	76,696	...	141,743
Tar	Barrels	12,009	...	13,389
Coals for steam-vessels in dockyards at home	Tons	6,047	...	10,501

* Ten years ago, the greatest length of any vessel in the navy was 210 feet, there are now several ships 350 feet in length.

† The steam dockyards and factories at Keyham (Devonport) have already cost 1,259,318*l.*; in order to complete them, some 270,000*l.* more will be needed, but that may be spread over a period of five years.

In the five French yards, the whole amount of timber (oak and mahogany) in store at the present time, is about a year's consumption, or 1,560,000 cubic feet, that is, about 40,000 loads.

According to the last official estimate of the present value of the hulls of all the vessels composing the French Navy, including those on the stocks, complete, under repair, in commission and in ordinary, the total was 4,613,952*l.*

Of what are designated as the "accessoires de coques, et du matériel en service," the value is computed to be 5,094,720*l.* more. In round numbers, then, the value of the whole fleet, including all vessels of every description would be 10,000,000*l.*, probably much less than half its original cost. In the valuations from which these amounts are extracted, the details are extremely copious and minute, descending not only to units in the francs, but even to centimes.

The following table shows the number of shipwrights employed in the different English dockyards during the year 1857–58, in building and repairing vessels; together with the estimated cost of the materials used by them :—

	Men. No.	Wages. £	Materials. £	Total. £
Building ships .	1559	109,130	272,825	381,955
Repairing ships .	1691	118,370	120,500	238,870
In mast, boat-houses &c. .	668	46,760	52,300	99,060
Total . .	3918	274,260	445,625	719,885

But these form but a small portion of the entire number of workmen of all denominations employed. For the present, and four preceding years, they were as follow :—

Years.	Persons employed in dockyards.			Convict labour.	Factory labour.	Total.
	Superintending officers, &c.	Established workmen.	Hired workmen.			
1854–55	434	9,621	619	940	1290	12,904
1855–56	459	10,850	1533	913	2079	15,834
1856–57	473	10,850	2151	1413	2510	17,397
1857–58	477	10,850	1465	1250	2382	16,424
1858–59	479	10,850	1365	1279	2361	*16,334

As nearly as can be ascertained at the present time, the computed number of mechanics, labourers, &c., in the five French dockyards, is 22,560; their pay amounts to 605,000*l.* or 610,000*l.*, but these calculations being founded upon circumstances, which are always fluctuating, can only be considered as yielding approximate results.

* In addition to the above, 795 are employed in the Victualling Yards and 450 in Naval Hospitals.

CHAPTER VII.

ON MANNING THE NAVY.

Various plans for manning the British Navy—Practical difficulties—Costly delays—"Continuous service system"—Royal Commission—Its Report—Mr. Lindsay dissentient—His letter—Number of vessels now in commission, and men employed—Increase since 1852—Condition of men on board receiving hulks—Recommendations of Commissioners—Royal Naval Volunteers—Training ships for boys—Recapitulation of recommendations—Their annual cost—Impressment—Its inexpediency—Merchant service—Mr. Lindsay's proposals—Their importance—His analysis of the Navy-list—Suggestions as to increase of officers—Amalgamation of Royal and merchant services—Summary of officers now on active list—Cost to the country of each class—Cost of unemployed officers—Absurdity of the present system of paying off ships—Available resources of England and France in merchant seamen—Education of French officers—*Ecoles Navales*—Discipline of French men-of-war—Difference between trained and untrained crews—Captain Plunket's description of a first day's practice—H.M.S. *Java* and U.S. *Constitution*—Causes of the capture of the *Java*.

No satisfactory solution has yet been found of that difficult problem which involves the maintenance, constantly and during peace, of a large body of men suitable for manning the Navy—having at the same time available reserves to be brought rapidly into action upon an emergency—without diminishing injuriously the industrial resources of the country.

Many plans have at various times been suggested, many projects have been tried, but we are still almost as far as ever from the possession of an organized system which should meet all the exigencies of the case.

It has been generally supposed that in time of peace no impediment is likely to occur in obtaining a sufficiency of men, but the First Lord of the Admiralty himself, has admitted that even with all the inducements held out, the Queen's service has been hitherto unpopular with the great body of sailors. "When the *Ganges* was commissioned," Sir John Pakington tells us, "she remained in harbour 110 days before completing her crew; the *Diadem*, commissioned in August, 1857, was detained 135 days, and did not go to sea till January, 1858; the *Renown*, commissioned in November, 1857, was detained 172 days for the same purpose, and then sailed 62 men short of her complement; the *Marlborough* was delayed 129 days; and the *Euryalus* 121 days." Some of these vessels were thus shown to have been delayed six months, all of them an average period of four months before they obtained their crews. This is a state of things which cannot be allowed to continue. In 1852, what was then and has since been termed the "continuous service system," was first introduced. Under it, seamen were engaged upon certain advantageous stipulations to "enter" for a period of ten years. This plan has now been in operation about six years, but it cannot be said to have worked satisfactorily, nor to have given the country such a body of well-trained and efficient men as was anticipated. It seems, therefore, that even in time of peace some modification must be introduced into this system of voluntary recruitment.

With this view, some months since, a Royal Commission issued, and Lords Hardwicke and Chandos, Mr. W. S. Lindsay, Mr. Cardwell, Mr. Martin, Mr. Elphinstone, Mr. Shepherd, and Mr. Green were appointed to examine witnesses and thoroughly investigate the subject, in order

to ascertain what remedy could be devised. On the 19th of February, 1859, their Report appeared, bearing the signature of all the Commissioners, with the exception of Mr. Lindsay, who published at the same time a letter, which will presently be more fully noticed, stating the reasons for his dissent. Judging from the bulk of the blue-book and the mass of evidence it contains, the inquiry must have been a laborious one for all concerned.

The Commissioners seem to have approved of the "continuous service system" as sufficient, so long as the country was not at war; in combination, however, with that system, they consider that the gradual organization of a permanent Navy must principally depend upon a supply of trained boys. Now, not above 500 or 600 of those lads who annually enter the Navy pass previously through the training-ships; they therefore recommend that at least five large vessels—of which we have an abundance on our hands—should be stationed at the different ports, forming, as it were, so many marine schools.

They consider further, that under all circumstances, a reserve of seamen should be maintained at each of the home ports, so as to have always a ready supply of men to put on board ships as soon as they are commissioned. These men would constitute the nucleus of a most important body, should a sudden armament ever be needed. The number thus retained would of course bear a due relation to the number of vessels in commission. With the present peace establishment it is considered that 4000 would be required, besides those on board the various harbour guard-ships.

The number of ships now in commission is 267, and of men employed on board them, 56,048. A detailed statement of the various stations, &c., will be seen in Table B,

page 107 in the Appendix. We have, then, 64 more ships and 14,883 more men afloat at this time than we had in April, 1852.

The following synopsis exhibits the precise number of ships and men (including marines and boys) in the pay of the State for each year, from 1852 to 1858, inclusive :—

			Period of War.				
	1852.	1853.	1854.	1855.	1856.	1857.	1858.
Ships	200 ...	210 ...	234 ...	288 ...	393 ...	279 ...	278
Men.	33,727 ...	39,801 ...	53,683 ...	65,710 ...	64,737 ...	44,479 ...	44,804

The Commissioners propose that the reserves to be instituted should be regularly drilled in gunnery, and the extreme importance of encouraging seamen to qualify themselves for marine gunners is strongly urged, with a recommendation that the pay of each such gunner should be increased to the extent of one penny a day. With a view also of retaining them when once qualified, they advise that a period of five years' service as seamen-gunners should count as six, towards a long-service pension ; and that the pension should be payable to them only in the United Kingdom and the Channel Islands. These measures appear to be rendered necessary by a review of the relative position of this class, as compared with the coast-guard and other branches of the service. The Commissioners recommend further, that of the 4000 men retained in the home ports, 1000 should always be seamen-gunners.

In their opinion, this is all that is needed to place the peace establishment of the Navy on a firm and satisfactory basis, and to secure the complete and efficient working of the "continuous service" system. Great care should,

however, be taken in selecting the men. Looking to the efficiency of the reserves they hope to form out of those who have served for ten years' continuous service, they think it is desirable that the men should not be above the age of twenty-five at the time of their admission, and above all, that they should be strong and healthy.

Their attention is next directed to the condition of the men actually serving on board ship. They admit—and there is no denying the fact—that from various causes, the great body of sailors prefer the mercantile marine to the Queen's service. To remove some ascertained objections, the Commissioners suggest some obvious and certainly not very costly improvements in the internal arrangements of the hulks in which the men are lodged whilst their ships are fitting out; the increase of the allowance of both bread and salt meat to one pound and a quarter daily (the rate of payment for savings, however, to be diminished); they advise further, that the bedding and mess utensils be issued as the hammocks now are, and that a suit of clothes be given to every man on his first entering for ten years' continuous service.* Other minor

* In conformity with this recommendation, on the 27th April last, the Admiralty issued the following notification, which, so far as it goes, is likely to have a beneficial effect, and has been well received:—

"With the view of improving the condition of the petty officers, seamen, and marines of the fleet, the Lords Commissioners of the Admiralty are pleased to direct that the following alterations shall be made in the scale of victualling of the Royal Navy, viz.:—The allowance of biscuit to be increased from 1 lb. to 1¼ lb. per man per day, the savings price being reduced from 2*d.* to 1½*d.* per lb. The allowance of sugar to be also increased from 1¾ oz. to 2 oz. per man per day. Their Lordships have further been pleased to approve an extra allowance of chocolate and sugar, to the extent of ½ oz. of each

recommendations relate to the mode of payment of wages whilst the ship is fitting out; the system of allotments

article, being issued either in the middle or morning watches, at the discretion of the captain, to such portion of the ship's company as may be much exposed during severe weather, or when, from circumstances of sickness or climate, or for other causes, he may consider it desirable. Their Lordships being also desirous that seamen on entering should, as far as practicable, be freed from the necessity of incurring debt, are pleased to direct that the following regulations be observed from the date of the receipt of this circular, viz.:—

"Bedding.—All men and boys on first joining one of her Majesty's ships shall be supplied with a bed, blanket, and bedcover, free of charge. On removal from one ship to another, the men are to take these articles with them; and in the case of death or desertion, they are to be returned to the charge of the paymaster.

"Clothing.—To every man on his first entering the navy for ten years' continuous service, and to all boys on being advanced to man's rating, a suit of clothes, consisting of the following made-up articles, is to be furnished free of charge:—

	s.	*d.*
A blue cloth jacket (No. 2 cloth)	17	8
A pair of blue cloth trousers (ditto)	11	7
A blue serge frock	8	6
A duck frock	2	9
A pair of duck trousers	2	7
A black silk handkerchief	2	10
A pair of shoes	6	7

Or he will be credited on the ship's books with a sum of money equivalent thereto, at the foregoing rates, to provide suitable description of clothing as may be required in the climate in which he is serving; and in the case of a seaman being already provided with clothes approved by his captain, a corresponding amount in money is to be placed to his credit.

"Mess Utensils.—Arrangements are being made to obtain mess utensils suitable for use on board her Majesty's ships, and as soon as the articles which it is proposed to provide shall have been duly tried, a gratuitous supply will be furnished to each ship on being put into commission, under such regulations as may be deemed expedient."

(which they recommend should be assimilated to the practice in the merchant service); the badge-money; the rank and promotion of warrant officers. The Commissioners anticipate the best results from "the occasional promotion of a warrant officer to the quarter-deck, at the same time admitting that the promotion should only be granted for distinguished service, combined with exemplary conduct; and it should not be limited to the warrant officers, but should be open, in the case of very signal and extraordinary services, to any seaman in her Majesty's Navy."

The second, and perhaps the most important point to which the inquiry was directed, was the mode of manning the fleet upon an emergency. As the law now stands, the only way of obtaining men would be:—1. By an embargo prohibiting merchant vessels from going to sea. 2. A bounty inviting men to enter on board Queen's ships. 3. A proclamation requiring *compulsorily* the service of all seafaring men.

Of "impressment" it is needless to say much, as, irrespective of its inhumanity and injustice, all are agreed that it could never again be revived; besides the requirement of the service, it should be remembered, is not for men only, but for trained men; and impressment would never supply practised gunners. The French system of "Inscription" would hardly answer in England, where the relative proportion in point of numbers, between merchant sailors and man-of-war's men is so different. The ballot is open to grave objections, and would press exclusively, and in consequence unfairly, upon a particular class of the community.

The present reserves of the country consist of:—1. The Marines now quartered ashore. 2. The Coast-guard. 3.

Coast Volunteers. 4. Short Service Pensioners. Of the Marines it is impossible to speak too highly; they are as fine, as efficient, and as well-disciplined a body as any that the State has at its disposal. They are available either as artillerymen or infantry, and, having their "sea-legs," they can perform many deck duties; but then their number is necessarily limited, because their efficiency of course depends on their being drilled for a considerable time afloat. There is at present a reserve of 6000 Marines in the different home ports. The Commissioners recommend that that number should be increased to 11,000, who would be well qualified to garrison the seaports in time of peace, and could be embarked at short notice, their place being then taken by the regular army or militia. The present complement of the Coast-guard is 10,000. A suggestion is offered for increasing it to 12,000, at an annual cost of 116,525*l.*

On the Naval coast volunteers as now constituted, the Commissioners do not appear to place much reliance, for the reason that they are not all properly "seamen," but rather, for the most part, fishermen, boatmen, and "long-shore" men. They are, however, fair gunners, and for the defence of the coast would be of considerable value, though of the deck duties of a sailor they can know but little. The short-service pensioners are those who have retired after ten years' service on a pension of sixpence a day. They form but a small body, though if the principle were extended to the marines, a corps of several (say of five) thousand might be obtained this very year (as in 1859 the discharges from the marine corps commenced), and that, too, at no considerable outlay. Besides 4000 seamen proposed by the Commissioners to be retained at home, there would be a reserve of 11,000 Marines, 12,000

Coast-guard men, the Short-service pension seamen, and the Naval coast volunteers. It is therefore computed that 30,000 men, obtainable in the manner above suggested, exclusive of the coast volunteers, would provide, if not an ample, at least a sufficient number to bear the first shock on the outbreak of hostilities. But beyond this, there is the admitted necessity of a continued supply of trained men to make good the havoc of war, and to keep up the Navy to an efficient standard.

It is suggested that the new body of men might be called the "Royal Naval Volunteers." The inducements it is proposed to offer to seamen to join this force are:— 1. A payment at short periods. 2. A pension at the age of fifty to fifty-five. 3. Payment for time spent in practice. 4. Admission to the Coast-guard. 5. Participation in the benefits of Greenwich Hospital. On their part they would engage to practise gunnery, and to serve in case of emergency; and conditions would be framed, to secure their coming forward to join the Navy within a very short time after their services were required.

Considerable reliance is placed, in the first instance, upon the influence of the Marine department of the Board of Trade, so far as concerns the primary selection of the force; much advantage is also anticipated from the establishment of the training ships (each capable of accommodating 200 boarders), half of whom might be supported by the country. All children residing at the ports where such ships were stationed, would be eligible as pupils, contributing a small weekly sum for the instruction they received. It is presumed that the greater number would go into the merchant service, though at the same time the most eligible would volunteer for the Navy. From this source alone it is calculated that 1200 able-bodied

lads, and from the mercantile ports as many more, would annually come, ready to engage in maritime occupations. Of such supplies ship-owners could not but be ready gladly to avail themselves, contributing at the same time a small yearly sum for the cost of the education of such apprentices; the amount thus levied to go in aid of the "pension fund." It seems that an annual contribution of 1*l.* from the age of fourteen, would secure to the sailor a pension of 12*l.* a year by the time he attained fifty; of 15*l.* from fifty-two to fifty-three; and of 18*l.* at fifty-five. It is therefore recommended that 5*l.* be paid quarterly to the seamen themselves, so as to secure their appearance at short intervals, and that the State should contribute besides, 1*l.* per annum to the Pension Fund for every man. The total annual cost of these school-ships, including training in gunnery, would probably be 200,000*l.* per annum.

The following statement exhibits the whole amount of reserve that would be at her Majesty's disposal, assuming that the Coast-guard and Naval coast volunteers were raised to the full amount contemplated for those forces respectively, before the commission was issued, and that the additions recommended were also carried into effect:—

Reliefs in the home ports	4,000	
Coast-guard	12,000	
Marines embodied	6,000	
Ditto short service pensioners	5,000	
Seamen, short service pensioners, say	3,000	
		30,000
Royal naval volunteers	20,000	
Naval coast volunteers	10,000	
		30,000
Making in all		60,000 men.

This is exclusive of the addition of 5000 men which might be made to the marines, without impairing the efficiency of that body as a naval force, should her Majesty be advised either to substitute that number of marines for troops of the line, or to add them to the whole military and naval establishments of the kingdom; nor does it include the 5000 volunteers whom it is assumed are absent on leave in the long voyages. "Of these forces," say the Commissioners, "the reliefs in the home ports and the Coast-guard may both be speedily raised, and this should be done at once. The marines embodied are taken at the number usually stationed in this country. The short-service pensioners, seamen as well as marines, will be filled up in about seven years. The royal naval volunteers may, in the opinion of the witnesses, be recruited without any great delay."

Recapitulating, then, shortly the whole of the recommendations in the Report, the country would, by their adoption, obtain a reserve of 60,000 men in addition to the 5000 marines suggested as a judicious increase to that force, and in addition also to 5000 volunteers, who would probably be absent on leave in the Merchant Service. For the alleged increased security thus obtained, the Government would have to provide an annual sum of 598,821*l.*, or, in round numbers, 10*l.* per head for the additional levies. If anything like absolute immunity could be guaranteed at the price, the premium cannot be deemed excessive, considering the enormous amount insured. The question is, would the adoption of all the recommendations embodied in the Report meet every probable exigency? Few naval men will be prepared unhesitatingly to reply in the affirmative. Such, however, is the result, after patient inquiry and mature de-

these how many would prove effective? Some ten or a dozen of them are, it is true, afloat, but mostly on board ships in ordinary. The lieutenant who heads this list has held his commission for nearly half a century, and must therefore be past seventy, while the most juvenile must be somewhere between forty and fifty, consequently almost past the time when the greatest amount of physical ability can reasonably be expected of him. Of the last 500, there are 365 afloat, so that only 17 per cent., of those in the prime of life, are left by way of reserve.

Of the 267 vessels in commission on the above date, some 34 were ships of the line. Now, supposing a sudden and serious emergency to occur, whence could we obtain a requisite number of efficient officers under the grade of commander? We have surely seen enough of late, without specifying instances, of the ill effects of entrusting important posts to superannuated veterans; is it wise to run the risk of a recurrence of similar mishaps? Still, no suggestion has as yet been offered to meet the very patent defect above indicated. It is possible that important advantages might be secured to the country by some approach to an amalgamation between the Queen's and the Merchant Service. In professional education, in social position, no less than in general attainments, the majority of officers in the Mercantile Marine are scarcely, if in any respect, inferior to their brethren in the Navy. Were an opening afforded whereby those who had distinguished themselves professionally on board merchant ships could, upon passing a suitable examination, become eligible for commissions in the Royal Navy, not only would a higher tone be speedily infused into a fine body of enterprising young men, already trained to a sea life, and to a certain extent disciplined, but the Government

would be relieved of what must necessarily prove a formidable embarrassment on the first breaking out of hostilities.

Whether this suggestion be adopted or not, it might be a wise course to throw open the advantages of Greenwich Hospital to well-conducted seamen who have served meritoriously for specified periods on board merchant ships. The income of that noble institution is now 140,000*l.* a year, a sum which, if more judiciously expended, would provide a comfortable asylum for a far greater number than are benefited by the relief it provides; at the same time that, as a home in old age, its hospitable shelter would be eagerly sought, instead of being, as under the present *régime*, shunned.

The following summary will show better than any longer and more detailed statement, the precise number of officers on the active list at the present time:—

	On the active list.	Actually employed.	Proportion employed per cent.
Admirals . . .	99 ...	14 ...	14
Captains . . .	357 ...	96 ...	27
Commanders . .	514 ...	173 ...	34
Lieutenants . .	1038 ...	696 ...	67
Masters	348 ...	263 ...	73

To rectify the disproportion to some extent, Mr. Lindsay recommends among other matters, the abolition altogether of the grade of "master," increasing at the same time the number of lieutenants to 1200, limiting the commanders to 250, the captains to 200, and the admirals to 30.

"During the Russian War," he observes, "there were 358 commanders, 260 captains, and 71 admirals, beyond the actual requirements of the service, and a further analysis shows, as might have been expected, that this

superfluity has tended materially to inefficiency. It is well known that out of 99 admirals, nearly one-half are between the ages of 70 and 90, and that out of 357 captains one-tenth are between 60 and 70, and that *one-half* (290) have never served afloat in that rank. This proves the existence of a system which ought not to be longer tolerated. We have an 'active list,' composed to a considerable extent of officers who are not active, many of whom are totally unable to serve afloat, and would be of no service to the country in an emergency. Numbers of them have rendered great service in their time, but that period has passed away, and therefore they should at once retire from the *active* lists. Then, again, there are, in the superior grades of officers, many who are able and anxious to serve their country, but for whom we could not find employment, even during a period of war, when nearly all our strength was put forth." Mr. Lindsay proposes to meet this difficulty by the gradual introduction, under certain restrictions, of a reserve of officers from the merchant service.

As the writer of the article already quoted from the "Conversations-Lexicon" has adverted, evidently without a very intimate acquaintance with his subject, to the payment of officers, a reference to the following table will show not only the number of officers from the active list drawing half-pay, but the aggregate cost to the country of each class during the current year 1859–60 :—

No.	Jan. 1859. Rank.	Amount each per annum. £ s. d.	Annual cost. £ s. d.
1	Admiral of fleet	... ...	1,149 15 0
20	Admirals	766 10 0 ...	15,330 0 0
23	Vice-admirals	593 2 6 ...	16,014 7 6
42	Rear-admirals	456 5 0 ...	19,164 0 0
86	Flag officers	(A)	51,658 2 6
261	Captains	51 on 264 12 6	13,495 17 6
		67 on 228 2 6	15,284 7
		143 on 191 12 6	27,402 7 6
	Total captains	(B)	56,182 12 6
341	Commanders	113 on 182 10 0	20,622 10 0
		228 on 155 2 6	35,368 10 0
	Total commanders	(C)	56,091 0 0
342	Lieutenants	2 on 127 15 0	255 10 0
		108 on 109 10 0	11,826 0 0
		232 on 91 5 0	21,170 0 0
	Total lieutenants	(D)	£33,251 10 0

N.B. The letters A, B, C, D have reference to the table at the top of the next page.

There has been, in each grade, an annual augmentation for some time past. From July, 1855, to January, 1859, the increased annual cost for "admirals' half-pay" is 5842*l.*, for captains 337*l.*, commanders 91*l.*, lieutenants 4227*l.*, the increased charge for the admirals exceeding that of the aggregate of the other three grades.

The following table exhibits the total cost of the whole of the unemployed officers of the Royal Navy, for the current year, 1859 :—

	Flag officers, retired	£8124	15	0
A.	„ „ half-pay	51,658	2	6
	Captains, retired	111,659	0	0
B.	„ half-pay	56,182	12	6
	Commanders, retired	67,333	7	6
C.	„ half-pay	56,091	0	0
	Lieutenants, retired	124,678	17	6
D.	„ half-pay	33,251	10	0
	Total	£508,979	5	0

The increase since July, 1855, amounts on the whole to 24,621*l*, the total, that year, being 484,358*l*.

Obviously, what is needed is a system of promotion which should induce the superannuated to retire, and secure at the same time the advancement of men of ability and in the prime of life.

It has been of late currently reported upon good authority, that it is intended to make a change of some importance in the ranks of officers: with the view of assimilating the nominal with the real rank of the different grades of officers. Should this arrangement be carried out, as it most probably will, all captains will for the future be styled commodores, the title of commanders remaining unchanged. Lieutenants will be called captains, while gunnery, flag, and first lieutenants will be entitled "staff-captains." The alteration will be only nominal, the relative position and pay of each of the above grades remaining unaltered.

The subject of manning the navy cannot be dismissed without calling forth a vehement condemnation of that insane practice of paying off a ship's company as soon as, by assiduous practice and strict discipline, they have been brought to the highest possible efficiency. A vessel is commissioned; by dint of great exertion—but frequently not without a delay of many weeks—a raw crew is obtained.

She sails, as the case may be, either for the Mediterranean, the Pacific, or the East India Stations. After an absence of three years—during which that rough and untrained company have been rendered proficient in all the duties that can be required of men-of-war's men; have above all learnt to know and confide in each other—the ship is ordered home, and is paid off; her now gallant crew are dispersed, never to meet again, many of them possibly never to serve more on board a British man-of-war, and the labour of years is thus utterly thrown away.

How so senseless a custom ever came to be tolerated it is difficult to conceive; still more unaccountable is the fact that this is the routine which has been in vogue almost from time immemorial. What would be thought of an individual who should devote himself exclusively for a couple of years to the production of a chronometer, in regulating which months should be anxiously passed, but who, when his task was accomplished, and after absolute accuracy had been attained, should set to work deliberately to demolish the object of all his solicitude, and to consign its materials to the melting-pot? Yet this has been precisely the irrational course we have been pursuing, with the additional vexation, that the costly materials we have so sedulously collected and then dispersed, have been in too many instances eagerly obtained by the agents of foreign powers, and drafted, at higher wages than we thought proper to pay, into their ships, possibly some day or other to serve against us; for it is an indisputable fact, that on board American men-of-war there are many English sailors, now naturalized subjects of their adopted country, and consequently lost for ever to the land which gave them birth.

Let us turn for a moment to the other side of the

Channel, and see how these matters are managed there. The vulgar notion, too prevalent in England, is, that a Frenchman can never by any process be made into a sailor, and that nothing need on that account be apprehended from France in the event of a future war. Had she suffered matters to have remained in the state they were from 1815 to 1820 they might have been so; but were any one with a competent knowledge of nautical matters, to make a tour of inspection through the French dockyards, and if he were a man of a thoughtful turn, he would find ample matter for serious reflection, possibly for astonishment.

There is not space within the limits of these pages to enter into anything like a detailed statement of the French naval system, suffice it, therefore, to say, that the whole maritime population of the country is registered upon what is termed the "Inscription;"* that every man, so long as his name remains thereon, is liable to be called upon, under particular emergencies, to serve on board the fleet. Annual levies are drafted from these in propor-

* The principal conditions of the Inscription are:—

1. That registered seamen have alone the right to navigate and to fish in the seas and waters of France.

2. When in the service of the State they are entitled to pensions after 25 years' service, and to pensions for wounds and infirmities on the same scale as the officers and men of the army. Their wives and children have also claims to pensions.

3. They are exempt from all military services.

By a circular, dated April, 1835, this system was carried to its present state of perfection. The permanent levy comprises all seamen from 20 to 40, as well as all officers of the merchant service up to the age of 45 (who have not previously served). The next class includes men who have not served above 4 years. After 3 years' service both officers and seamen are entitled to their liberty till they are again called out; and 6 years' service exempts them from all further liability to the ordinary levies. This mode of raising men, traces them wherever they may be, whether at home or in any French port.

tion to the number and requirements of the ships at the time in commission.

After deducting those actually on service, from the total number of men registered on the maritime inscription, the country will always have a formidable reserve available at a comparatively short notice.

It will, doubtless, be interesting to the reader to be enabled to form a correct idea of the available resources which England and France respectively possess under the head of mercantile marine. The following statement, showing the number of vessels belonging to both countries, their tonnage, and an approximative estimate of their aggregate crews, is subjoined, for the purpose of supplying the requisite information. It gives, from the latest returns, the amount of shipping at present pertaining to both countries, together with the number of merchant seamen they severally employ :—

England.		France.	
Number of Vessels Registered.			
Sailing . . .	24,406	Sailing	14,845
Steam	1,813	Steam	330
Total . .	26,219	Total . .	15,175
Tonnage of Vessels Registered.			
Sailing . . .	4,075,245	Sailing . . .	980,465
Steam . . .	416,132	Steam . . .	72,070
Total . .	4,491,377	Total . .	1,052,535
Average Tonnage per Vessel.			
171 tons.		69 tons.	

ENGLAND.	FRANCE.
Crews of Vessels.	
In the shipping engaged in the home trade 860,406 tons (exclusive of river steamers), 43,600 men are employed, besides masters; this gives one man to every 19¾ tons, which, upon the 4,491,377 tons of shipping registered, shows an aggregate of 227,411 men.	In the shipping engaged the fisheries, and in vessels t ing between France and her lonies, 360,664 tons, 30,997 are employed; this gives one to every 11¾ tons, which, t the 1,052,535 tons of ship registered, exhibits an aggre of 90,217 men.

The foregoing comparison includes only the shipp and crews belonging to the United Kingdom, but on 1st January, 1858, the Channel Islands and British I sessions employed the following number of merch vessels, tonnage, and crews, viz. :—

Vessels	10,869
Tonnage	1,040,510
Crews	72,946

From the researches of the French Commission, it found that the real number of able-bodied seamen in merchant service in the year 1850, was 38,500, includ officers, marines, and seamen. At the same time 16, were serving in the Imperial Navy, showing a tota 54,500 men.

The general conclusion at which the French Comi sioners arrived in 1851, was, that allowing for every tingency, France might rely upon 40,000 seamen perfe qualified for maritime warfare, and on 20,000 more ta partly from the register and partly from the army, able to render good service when acting in combina with the first class.

Admiral La Susse, one of the witnesses examined the Commissioners stated that at that time (1850–51)

computed the number of registered seamen, from 20 to 40 years of age, at 50,000. Adding the men that might be selected from the army and from the *Infanterie de Marine*, France, in case of war, could, in his opinion, count upon 90,000 men, a quantity then sufficient to man every vessel in the fleet.

For the last twelve or fifteen years the French have been bestowing great pains on the education of their officers. An opinion, indeed, prevails upon the continent that French naval officers are far a-head of the English in all that pertains to theoretical training and tutored intelligence. Many of our own officers, too, who have had opportunities of judging, do not scruple to admit that in seamanship no less than in other professional acquirements they have found themselves, to their surprise, fully equalled by the members of the Imperial naval service with whom they have come in contact.

It has been urged as a defect in the education of midshipmen that they may be raised to posts entailing much responsibility, without being necessarily qualified to navigate a ship: the institution of masters, who occupy a subordinate position between the warrant and the commissioned officers, and who usually do not receive promotion beyond their own grade, being the alleged cause of the gravamen. To the Master is entrusted the "working" of the ship; he must, therefore, be proficient in every branch of navigation—be able to take accurately both terrestrial and celestial angular distances; to "procure the rates" for the chronometers as well as to take charge of those instruments; and he must also have a competent knowledge of marine surveying. In short, so numerous and important are his functions that the captain, as a celebrated admiral once truly remarked,

"can scarcely *move* without him." Now all the above duties of a master are, on board a French ship, discharged either by a junior lieutenant or by the captain himself; the commissioned officers being all equally qualified in that respect. It is true, that our modern naval colleges are intended to supply a deficiency which has been allowed to exist too long. The instruction in theoretical navigation inculcated in these institutions will achieve as much as can be accomplished by such means; but so long as the young cadet knows, that in after life, he will be relieved by the "master" of the necessity and responsibility of navigating his ship, he is not likely to pick up more information on that subject than will suffice to take him through his examination.

In the *Ecoles Navales*, the science of navigation is deemed of paramount importance, and each aspirant for naval fame must previously pass through a severe ordeal before receiving his diploma.

With respect to the general discipline of a French man-of-war, suffice it to say that, as in all that regards her internal economy, great improvement has of late been introduced, and the most perfect order, regularity, and cleanliness in every department is rigidly enforced. In the performance of all evolutionary duties it is easy to perceive that our own routine has been attentively studied, and often closely copied; while in lieu of that noisy jargon that in former times invariably assailed the ear, between decks, one voice and one pipe alone are now heard conveying each successive command: the truth of the old adage, that "silence is the soul of subordination," being at last admitted even by the garrulous Gaul.

Nor is the French merchant seaman wanting in a knowledge of that stricter discipline absolutely essential

in the Navy. In the course of nine years the entire body of merchant seamen must pass through the Navy.

"The result of what is now termed the permanent 'levy,'" according to M. de Fleurieau, one of the witnesses examined before the French Commission in 1851, "is that all the seamen of the fleet taken from the maritime inscription have passed successively on board the vessels of the State, and that all have received a complete education both in respect to seamanship and gunnery."

Every individual is consequently a trained man-of-war's man, available at any subsequent time for his country's service, and only requiring a few days' practice to resume the duties he has already learnt. Besides this wise regulation, which maintains inexpensively a vast reserve, there is another of scarcely less moment, which renders it imperative for every master mariner to serve for a specified period on board a ship of war before he can be entrusted with the command of the smallest trading vessel. He thus becomes acquainted not only with the proper methods of mounting and dismounting artillery, housing and securing guns for sea service, training, pointing, elevating, and depressing every variety of ordnance used afloat, but he is also made conversant with the laws of projectiles, and acquires all the knowledge requisite to constitute the naval artillerist. These are points upon which the ordinary master of an English merchantman would be about as likely to possess correct information as a Sussex plough-boy or an Old Bailey attorney.

To a landsman, the difference between the crews of two similar vessels will not be very apparent, though he may be informed that one ship's company mustered at quarters for the first time yesterday, and that the other has been for two years afloat in the Mediterranean. But

if the opinion of any naval officer be taken, he will be found to express in very unqualified terms his conviction that the untrained, undisciplined men, who have as yet no knowledge of their officers or of their duties, no confidence in one another, and lack almost all the qualities of men-of-war's men, excepting, perhaps, animal courage, are wholly unfit to be taken into action. He knows full well that, had they to encounter in earnest an enemy's ship of even inferior size, the result might be humiliating to the flag under which they fought.

So graphic a description* has been penned of the scene which would infallibly ensue were the finest line-of-battle ship in the service, under the above state of things, to be suddenly brought into action, that no apology is needed for introducing it here:—

"The first night has passed away, a night of sorrowful regret to the young landsmen, of gloom to the pressed seamen, of high hopes to the younger officers, and careful reflection to the elder. Blithe morning finds the gallant fleet (yet, oh! how different in efficiency from what it will be in a few months, if the fates permit) still urging its course to the hostile shores. There is a slight swell, and the detachment of H.M. 150th (newly raised) together with the smock-frocks, though not quite sea-sick, look what is termed 'rather seedy.'

"The bells of the fleet are striking two (that is nine A.M.), and the quick eyes of the signal midshipman have detected three little bundles rapidly ascending to the flagship's main-royal mast-head. The small bundles burst, and display three bright-hued flags, which, duly interpreted, mean 'exercise great guns and small arms with

* "The Past and Future of the British Navy," by Capt. the Hon. E. Plunkett.

shot.' A stir and bustle succeeds the announcement; and while the drums and fifes are playing 'Hearts of oak' the men hurry to their quarters, but with much awkwardness, and not little mutual obstruction. Some landsmen,

> "'Whose wits are in the corn-fields,
> Whose wits are not here.'

have forgotten the gun they are stationed at, and one such wanderer, being recognised, is called to his quarters; but the landmark he had chosen over-night to assist his memory is, unhappily, removed—it was the portable fire-engine ('that 'ere turnip cutter,' Lubin calls it), and he shakes his head negatively.

"With some shuffling and confusion the guns' crews have got into their places, and wait for orders.

"Let us fix our eyes on a particular gun. It is the tenth gun on the middle deck of H.M.'s ship *Neptune*, 120, and the few trained hands having been quartered either on the lower or upper deck, the gun's crew are all novices. Numbers 1, 2, 3, 4, 5, and 6, are merchant sailors, chiefly pressed men; 7, 8, and 9, are young recruits of the 150th; 10 and 11, are rustics from Somersetshire, with flaxen hair and pudding heads; 12, is an Irish hodman; 13, a cockney pickpocket, 'under a cloud.' A young midshipman of fifteen, from Eton, who has fortunately learned his own gun exercise,* is the instructor. With the sanguine confidence of youth, he

* "Of all the improvements of modern days (and they are many), the greatest is making the officers *learn practically* the exercise they are supposed to teach the men. Why is the *old* practice of making the young midshipmen exercise "aloft" going out, as the other practice is coming in? If their numbers be too few to reef or furl a sail by *themselves*, what objection is there to exercising them *with* the ship's boys?"

imagines that *his* subdivision will soon attain perfect
forgetting the many weeks of hard work which
knowledge cost himself; but there is up-hill work be
him. He has got the guns' crews to call their num
right. 'Zomersetshire' at first insisted upon calling '
hundred and vifty-five,' which was his number on
'watch bill,' and the Irishman roars out 'a tousand
ten,' because it is his number on the 'ship's bo
No. 3 has learned that the powder should precede
shot, he had previously laboured under the contrary
pression. No. 6 has learned to present the right en
the rammer to No. 4, though in doing so he picks
teeth of No. 3, and gives 5 a black eye, receiving
blessing in return. No. 4 has succeeded in ramming h
after losing one rammer overboard (as he is a pre
man, this is set down to sulkiness, and he is black-li
accordingly). The young midshipman giving the "det
has explained that "at the word *point!* No. 1 re
to the full extent of the trigger line." This No. 1
forms to the letter, evidently wishing the trigger
twice as long, but he is not so successful in placing
self properly. The attempt to 'lean well over on
right knee, keeping the left foot well clear of the re
produces a grotesque attitude, resembling a spread e
or a clown's on the stage, and the effort to 'look stea
along the sight,' causes terrible contortions of his c
tenance with the shutting of the wrong eye.

"By the time the word 'ready' is given, No. 1 has
both his eyes, and stands grinning fearfully, like
original Saracen's head. The country bumpkins
improved on the example of 'No. 1 the captain,'
while shutting their eyes, they also stop their ears
their thumbs, thus exhausting the remaining patienc

the young Etonian. At last the word 'fire!' is given, and No. 1, who has been warned to 'spring up to the safety position on the left,' does it so effectually as to make 'a cannon' off the left rear man, and pocket himself down the hatchway. Some of the other numbers have also sprung up to the 'safety position,' not quite certain as to what direction the guns usually recoil in, and the bumpkins are still standing open-mouthed, in expectation of a *second* explosion. In the meantime, although no enemy is in sight, there is a fair average of wounded, through their own clumsiness; and a young assistant-surgeon is heard to say, of a man with a ghastly-looking compound fracture, 'It will make a *vara* pretty case of amputation.' A few shells have exploded through want of skill in those who handled them, killing and wounding a score or two, which leads to a 'general order' against their use, except where artillerymen or seamen gunners are embarked.

"A signal from the flag-ship closes the exercise, which has been got through, as is said of ladies under certain circumstances, 'as well as can be expected,' yet certainly not as well as might have been wished. Thus ends the first essay with raw crews, who nevertheless only want time and practice to make them perfect. Are they sure of either?

"The commander-in-chief, who is too sensible a man to complain of that which his experience led him to expect, has nevertheless quietly observed to the captain of the fleet, 'It is just as well that this day's practice was not against an enemy.'"

Nor can this picture, limned as it is by a master hand, be deemed in any way too highly coloured. Under such circumstances as those Captain Plunkett supposes, the

exhortations, the invectives, or the entreaties of the officers of any ship, would prove of little avail were she to encounter a well disciplined opponent, her own crew having been but recently collected, and having had no opportunity whatever of acquiring a knowledge of their duties. Those who are of a different opinion have only to refer to the page of history.

It will be sufficient here to cite one instance: in August, 1812, the *Java* was captured by the American *Constitution*, under circumstances precisely analogous to those above alluded to. On that disastrous day, the British frigate, manned almost entirely by raw landsmen, was in thirty minutes reduced by the superior gunnery of the American, to a sinking state, having lost, in that brief space, 100 killed and wounded, while the Americans had but seven killed and as many wounded. The *Java*, from sheer inexperience and want of skill, missed the opportunity, which the seamanship of her gallant captain (Lambert) had gained for her, and failed at a critical juncture to pour a raking broadside into the stern of the *Constitution*. It would not, unhappily, be difficult to cite, from our annals, more than one similar misfortune springing from the same sad cause. But it is scarcely possible to explain to the non-professional reader the actual difference between trained and untrained crews, because no real comparison can be instituted as to the relative efficacy of their fire. But men who have been regularly exercised at quarters for two years, will, with ease, work their guns with three times the rapidity which gunners could display, who have not had the advantage of their discipline and practice. In future it may be assumed, that almost every naval engagement will be decided by gunnery alone, a point upon which the French

at least have long since been thoroughly convinced. Can any one, then, hesitate to admit what would be the effect of a fight between two frigates, each carrying an equal weight of metal, one of the two receiving three broadsides in reply to each that she discharged? Another, and scarcely less important consideration, is the one already enumerated, arising from that bond of union which necessarily springs up in every well-trained body, accustomed to act together. Far differently do men either work or fight who have been long accustomed to each other, and can rely for support upon one another, from those who have been hastily collected at hazard, and find themselves suddenly placed by chance under a commander of whose skill and abilities they know nothing.

In bringing to a close these observations on the *personnel* of the Navy, their value will, perhaps, be enhanced by the subjoined tabular statement, showing the number of seamen (including officers), boys, and marines, voted for the naval service from 1848–49 to 1858–59 inclusive:—

Year.	Seamen.	Boys.	Marines.	Total.	Borne.
1848–49	27,500	2,000	12,500 and 1,000 in addition for 6 months.	42,000 and 1,000 in addition for 6 months.	43,978
1849–50	26,000	2,000	12,000	40,000	39,535
1850–51	26,000	2,000	11,000	39,000	39,093
1851–52	26,000	2,000	11,000	39,000	38,957
1852–53	26,000 and 5,000 in addition for 4 months.	2,000	11,000 and 1,500 in addition for 4 months.	39,000 and 6,500 in addition for 4 months.	40,451

	Year.	Seamen.	Boys.	Marines.	Total.	Borne.
	1853–54	31,000	2,000	12,500	45,500	45,885
War with Russia.	1854–55	46,000	2,000	15,500	63,500	61,457
	1855–56	44,000	10,000	16,000	70,000	67,791
	1856–57	50,000 for 3 months. 33,333 for 9 months.	10,000 for 3 months. 6,667 for 9 months.	16,000 for 3 months. 16,000 for 9 months.	76,000 for 3 months. 56,000 for 9 months.	60,659
	1857–58	27,530 3,500 Coast-guard. 2000 in addition for 9 months.	5,470 420	15,000	53,700 2,000 in addition for 9 months.	50,419 3,500 Coast-guard.
	1858–59	30,900 3,500* Coast-guard.	6,100	15,000	55,500	52,363 3,500* Coast-guard.

* Excluding coast-guard men on shore.

CHAPTER VIII.

NAVAL TACTICS AND GUNNERY, AND MODERN IMPROVEMENTS IN ARTILLERY.

Sir H. Douglas's treatises—Iron-plated vessels—French rifled ordnance—Seamanship not superseded by steam—Naval tactics—Various manœuvres—Sea-fights assimilated by steam, to land engagements—Writers on naval tactics—Modern armaments—French naval tactics—Naval gunnery—Its principles—Recent improvements—Reduction of windage—Rifled ordnance—Whitworth's guns—Armstrong's guns—Shells—Fuzes—Warry's gun—Norton's liquid fire—Norton's steel-pointed bolts—Description of the new French artillery—Improvements in rifled small-arms—Horsfall's gun—Captain Blakely's remarks on artillery—His gun—Table showing the weights of shot of different calibre in the French, Russian, Danish, and Dutch Services.

On each of the points that form the subject of this chapter, there exists no higher authority than General Sir Howard Douglas. In his two admirable treatises on naval gunnery, and on naval warfare with steam, he has fairly exhausted both topics, and has collected in a compendious form all that is at present known upon them in our own as well as in any other service. In so able a manner has he treated all that pertains to marine warfare, that it would be impossible to give even the slightest general outline of the science of modern gunnery without taking for a guide throughout this accomplished master of the science.

Perhaps in the last half-century no art, not excepting even that of naval architecture itself, has undergone so marvellous a revolution as the one in question. For this

reason it may be predicated with tolerable certainty, that the daring tactics which triumphed at Trafalgar are not likely again to be of avail in any great general action, unless, indeed, the iron-plated frigates, of which much has been lately said, are destined hereafter to re-enact scathlessly the part so bravely achieved by the *Victory* on that memorable day. Allusion has already been made to the confidence reposed by the French in this new agent of warfare. In their opinion, impenetrability combined with the highest attainable speed, is to be the great essential of all ships of war. By the extreme rapidity of movement which they hope to impart to their new vessels of all denominations, French naval officers expect for the future to atone for any deficiency in other respects, either in the *matériel* or the *personnel* of their squadrons. They refer constantly, and with pride, to the effect produced upon Europe by the dispatch shown in 1849, in the embarkation and transport of a powerful armament from Toulon to Civita-vecchia, a few hours having then sufficed to transport two regiments, with all their baggage, from the shores of France to the coasts of Italy.

The opinion generally prevalent amongst officers of the French marine is, that were two fleets numerically equal in ships and guns, one belonging to this country, and the other to France, now to meet in deadly encounter, it would be impossible to predict the result. "Le génie d'un chef," says a well-known French writer,* alluding to this subject, " ou toute autre particularité, sera le moyen dont la Providence se servira pour décider du succès; mais, quant à la préparation, elle sera la même de part et d'autre. Les combats antérieurs à la République Française, et même quelques-unes des affaires de cette époque, prou-

* M. MacSheehy.

vent que les qualités des deux peuples sont équivalentes pour la guerre sur mer, et toutes les circonstances qui ont amené les derniers revers de la marine Française ont disparu depuis bien des années."

The science of destruction in France, as elsewhere, has kept pace with the progress of the gentler arts, and naval gunnery has advanced as much amongst our neighbours as ourselves. They attach no small importance to the adoption of their* rifled cannon, which is calculated, as they assert, to project a missile twice the weight of an ordinary ball thrice the distance, with the same charge of powder. For this reason, and from a concurrence of similar causes, most of their writers agree that, however sanguinary any future engagement might prove, its issue must soon be decided, while no doubt is entertained that it must necessarily involve a far greater destruction of *matériel* than occurred in former sea-fights. This they allow would be of more serious moment to them than to England, with her almost boundless resources. It was no doubt this reflection which induced the prosecution of a long course of experiments at Vincennes and elsewhere, with a view to devise the most effectual means of protecting ships from injury, at the same time that measures were taken for providing them with the most destructive armament.

The result of numerous trials appeared to convince those best competent to judge of such matters, that iron plates, or rather slabs, 11 centimètres (about 4½ inches)

* The Imperial foundries are now busy casting large numbers of the new rifled ordnance for marine purposes. 800 field-pieces and 400 siege guns are already nearly completed. A great number of artillery officers have been sent to La Fère to be trained in the use of this new artillery.

in thickness, would offer adequate protection to a ship from the effects of hollow shot. Acting upon this impression, four floating batteries resembling in most respects those constructed here, were ordered to be built, and notwithstanding the enormous difficulties connected with such an undertaking, these four vessels were turned out, complete in all respects, in ten months—an astonishing instance of the resources of French dockyards and the ability of French engineers.

From this event may be dated the commencement of a new epoch in naval tactics. The next problem was to determine whether a form better adapted for progression than that of these batteries could not be given to vessels sheathed in a similar manner. Hence originated the iron-plated frigates (*frégates blindées*). The intention of their designer is, that they should have a speed and an armament at least equal to that of the swiftest existing frigates, but their colossal weight, and consequently their great draught of water, must almost preclude the fulfilment of this expectation. Should they prove successful, a number of larger ships of the same kind are to be commenced forthwith. It is difficult to understand how, in the case of these ships being found to answer, it will be possible for us to avert a real "reconstruction" of our Navy, or, how any other nation, aiming to rank as a maritime Power, can avoid the adoption of a similar course. In fact, the necessity has been appreciated, and we are already at work. But a good deal has to be accomplished ere the use of such vessels becomes universal. If these iron-plated vessels do resist shell, it seems certain, as has been already stated, that solid shot will either perforate at short ranges any thickness of metal that has yet been tried, or will so indent the sheathing at longer distances,

that the internal lining and rib-work of oak will be riven, shattered, loosened, or crushed to an extent that would almost as speedily put the ship *hors de combat* as if she had but been built after the old fashion. Much, as in days gone by, upon the introduction of gunpowder into warfare, the use of armour was found rather to aggravate, than to ward off, the injuries inflicted by gunshot. It was the result of the operations against Kinburn that more particularly gave rise to the high opinion at present entertained in favour of these *vaisseaux blindés*. Unwieldy and cumbersome as they appeared, they were certainly a great improvement upon the floating batteries used by the French and Spanish against Gibraltar in 1782. Those were merely enormous hulks, destitute of masts, sails, or rigging; their sides were composed of solid carpentry, six feet six inches in thickness, and they carried from nine to twenty-four guns. When in action, streams of water were made to flow constantly over their decks and sides, but notwithstanding every precaution, such an overwhelming storm of shell and red-hot shot was poured upon them by the English garrison, that they were all speedily burnt. Not so, the *Devastation*, *La Lave*, and *La Tonnante*, before the Russian fortress above mentioned, on the memorable 14th October, 1855. At 9 A.M. they opened fire, and in one hour and twenty-five minutes the enemy was silenced, nearly all the gunners being killed, their pieces dismounted, and the ramparts themselves being for the most part demolished. To accomplish this destruction in so short a space of time, the three batteries, each carrying eighteen 50-pounders (supported, of course, by the fire of the English vessels), advanced in very shallow water within 800 yards of the walls, receiving

themselves very little damage in comparison with the immense havoc they occasioned.

The dispatch containing the report of this engagement made no inconsiderable sensation in France amongst naval men, and gave rise to the conviction that iron-sheathed batteries would necessarily act a prominent part in future wars. It seemed to be at once conceded, that against stone forts, difficult of approach on account of shoals and sand banks, vessels such as those under consideration must henceforth be employed, to the exclusion of those stupendous three-deckers whose draught of water so frequently impedes their movements in expeditions along shore.

In deep water, or on the high seas, in the array of battle, and against vessels of similar construction, the power and utility of ships of the line would be unquestionable, more especially on distant stations; but for work such as that at Bomarsund and Kinburn, it is evident that a different kind of craft must be employed. Lord Lyons appears to have concurred in the views warmly expressed at the time by the French admirals who co-operated with him in the Black Sea. To their earnest representations, indeed, in no small degree, is the construction of these iron-plated frigates attributable. Perhaps steel-plated, will become the more correct designation, since the result of numerous experiments at Shoeburyness, and the practice of the *Excellent* against the floating batteries has clearly shown that something must be resorted to, endowed with greater resisting power even than the massive sheets of metal hitherto adopted, in order to withstand the concussion of 68-pound shot at close quarters.

Before dismissing the subject of the French floating bat-

teries, it should be observed that they have each a screw propeller, of sufficient force (225 horse power) to move them from point to point when in action; but in a seaway it is necessary for them to be towed, as, unaided, they can barely make three knots per hour. They are pierced for 24 guns, but only carry 16. The hulls of batteries of this kind cost about 24,000*l.* each, and the engines and boilers about 15,000*l.* more.

To return, now, to the subject more immediately before us—that of Naval Tactics. The subject will bear consideration under two heads; first, as regards warfare under sail, and, secondly, under steam. Whatever discoveries may yet be made, in the present state of our knowledge it is quite certain that canvas cannot be dispensed with; consequently, every officer in command of a ship of war ought to have the same thorough knowledge of the mode in which she should be worked, under sail alone, as if she had that motive power alone to rely upon.

The leading principles of ocean warfare are simple enough, the chief movements consisting in advance or retreat, and in the formation of the order of battle. Six orders of sailing have been generally enumerated by writers on this subject: namely, the line a-head, either on the port or starboard tack; the line a-head, perpendicular to the wind; on two lines of bearing; in parallel columns before the wind; or oblique to the wind; the order of retreat on two lines of bearing, making with each other an angle of 135 degrees.

It may be necessary here, perhaps, to explain that a "line of bearing" is one, six points from the wind, on which the component vessels of a squadron may be ranged, in such relative positions to each other, that by a simul-

taneous movement they can at any time be prepared to form in line of battle. There are, of course, two lines of this kind. The *starboard* line of bearing, on which the squadron may be ranged before "forming" on the starboard tack; and the *port* line, when by a simultaneous evolution, and for a similar purpose, they are enabled to "come to the wind together," or wear or tack in the opposite direction. A number of vessels, ranged on either line, may "stand" with their bows across the particular line they are directed to preserve; they may, therefore, be sometimes on one tack and sometimes on the other, though all the while upon their proper *line of bearing*.

When they assume such a position—sailing in succession—that they are six points from the wind (on either tack), they are then in what is technically termed, the "line of battle." The "order of sailing," is the particular formation of a squadron of vessels, under one flag-officer, when directed to steer a particular course or to cruise in a specified direction. In an open sea-way, where there is plenty of room, the order is usually in three columns, but in narrow channels two columns are far preferable.

When the wind is "right aft," and each vessel pursues a line precisely parallel to the rest, the heads of all being in one line, they are said to be in "line abreast."

The movements of a squadron are sometimes directed to be made "simultaneously," and at others "successively." In the first case, being all effected at the same time, and under the same circumstances, there is little probability of any alteration in the relative distances of the different ships; in obedience to the latter order, each ship has to wait for the execution of the prescribed movement by her leader, a state of things, in foul weather, which occasionally gives rise to casualties. In the olden

time, indeed, though in the memory of officers still alive, an interval of three or four hours has been known to occur between the time of making a signal and of the compliance therewith, of the aftermost ship.

Many works on naval tactics are replete with a variety of complicated hypothetical cases, which could never really occur, and which, if they did, could seldom be solved in the manner suggested. It would obviously be out of place to discuss such subjects here; suffice it to describe one or two of the simplest evolutions.

Let us suppose, then, that it is required to change from the line of battle on the port tack, wind south, squadron heading E.S.E., to a position requiring the port division to sail large, steering north on the starboard line of bearing; the port division, being at the same time required to steer the same course, keeping the starboard line of bearing. The proper mode of accomplishing this evolution would be as follows:—

The vessels take up the line of battle on the port tack. The starboard division remains stationary, ready to bear up simultaneously, as soon as the ships on the port division come up on the starboard line of bearing.

Again, let a squadron of twelve ships, sailing in three parallel columns on the starboard tack, be required to form in order of battle on the weather column:—

The weather column keeping under easy sail, the centre line and that to leeward tack together, keeping two points away till they fall into the wake of the leading ships. Each then tacks and takes up her proper station.

The reverse of the above evolution would be thus accomplished:—

The twelve vessels, it will be remembered, now form one line. The four leading ships of course retain their

position, keeping under very easy sail. The fifth, six seventh, and eighth will form the centre column, and other four the sternmost column. These last (i.e., ninth, tenth, eleventh, and twelfth) having twice the tance to traverse, will have to make rather more sail t the four centre ships, but the second and third divis will keep away together one point. As soon as the l (of the first ship in the centre division) is about abeam the leading ship in the weather column, the whole of centre division will haul their wind together. The ward column follows precisely the example of the ce division. It will have been perceived, that in the for tion upon the windward division it is essential that two other divisions should "go about" together, tac again as soon as they have successively got into the w of the four leading ships. They will thus have l compelled to traverse as it were two sides of a tria instead of one.

Steam vessels, in executing similar manœuvres, w simply proceed at once to their allotted stations by shortest course. At the same time it may be observed, the intervening space between vessels impelled by st need not be considerable; they ought, in fact, to be in closer columns, so that the commander may at all ti have his whole force in view, while they will have difficulty in at once discerning his signals.

When in line of battle, the space between any ships should never be less than a cable's length (fathoms), supposing them to depend entirely upon t sails—in modern times scarcely a probable contingc The whole of the ships should be close hauled, bec under that trim they are most easily kept under c mand and in their proper relative positions. In sh

lines close-hauled constitute the primary condition upon which lines of battle and most orders of sailing are formed.

A fleet attacking an enemy's force to leeward, would run down either directly abreast, or in an oblique line of bearing, each vessel steering so as to keep her opponent bearing on the same point. By this means the weather division can at any time readily form a line parallel to that of the enemy, and may select its own distance wherefrom to commence the engagement.

In all the naval actions of past times, indeed, the great object has been to obtain the weather gage, because the fleet or squadron in possession of that advantage, can either compel its adversary to engage at close quarters, to bear up, or to retreat. A fleet finding itself to leeward of an enemy, cannot, on the other hand, force one that has the weather gage to fight. The only real advantage it possesses being that in case of inferiority of strength its retreat is open.

Steam, however, has put an end to the various disabilities attendant upon the accidentally unfavourable positions of hostile fleets. Year by year, engagements on the ocean will become more and more assimilated to land battles. Quickness of perception and promptitude of action will now turn the day, while its fate will be far more speedily decided than it used to be in the days of Rodney, Jervis, Howe, or of Nelson.

All the difficulties under which sailing-vessels necessarily labour, disappear before a fleet composed of screws, provided only that their stock of fuel be not exhausted, and that all their complicated mechanism be in order. Steamers fight, too, with their sails closely furled, so that a large portion of their crews, which in

sailing vessels would be manning the bow-lines or bra
&c. could be employed exclusively at the guns.
movement of each ship, and the due preservation of
position, being managed by half a dozen men in
engine-room, below the water line, and consequer
almost out of reach of danger.

No great expenditure of steam would be requi
during an engagement at close quarters; for the m
rapid the movements of the ship, the less would be
precision of her fire, and of course the nearer the stat
each vessel approaches to a state of rest, the more
cacious will be her fire.

With all their great advantages, however, there
helplessness about steamers, under certain circumstan
that renders them, in some respects, inferior to sai
vessels which, containing all their requirements
months, or even for years, may keep the sea almost ir
finitely; whereas their modern rivals must always ren
within a moderate distance of a coal depôt, which n
be regarded as analogous to a base of operations.

Although, as has been already remarked, it is not o
that great speed is required from a man-of-war, she sh
have the power of exerting it when the necessity occ
Sir Howard Douglas is of opinion that this point has
been sufficiently taken to account in the constructio
the British Navy, and that of two squadrons (English
French) equal in numbers, the general speed of the la
would be found superior to that of the vessels compo
the former.

The movements of steam fleets or of squadrons, c
posed partly of full power steamers and partly of sai
ships, with auxiliary screws, should be made under st
alone, otherwise the whole would incur the risk of be

delayed should the wind shift or drop. All attempts at combining the tactics of both steam and sailing vessels, necessarily having the effect of detracting from the unquestionable advantages afforded by the screw. It may on the whole be affirmed that steam has not altogether superseded the use of canvas, nor has it rendered good seamanship one whit less needful than before its introduction. Every ship in time of war, will require her full complement of able seamen, and her gunners must be proficient in all that pertains to the practice of their art. A heavy steamer rolls far more than a sailing ship of similar size, so much the greater, therefore, is her tendency to cause inaccuracy of aim. To obviate this difficulty, steam men-of-war are now provided with heavy pendulums suspended amidships, the movements of which the captains of guns, with trigger-line in hand, watch carefully, pulling the laniard only at the precise moment that the perpendicular position of the pendulum indicates that the vessel is on an even keel.

In military warfare, the system of fighting, line against line, masses against masses, has long since become obsolete. The modern mode of tactics which may be said to have been first adopted about a century ago, requires the exercise of greater tact and generalship. The object now of two hostile armies is either to outflank each other, or else by a succession of evolutions to concentrate upon some one decisive point, an overwhelming force sufficiently strong to crush all resistance, let the entire numerical strength of the enemy be what it may. Most of Napoleon's victories afford practical exemplifications of the efficacy of this mode of fighting.

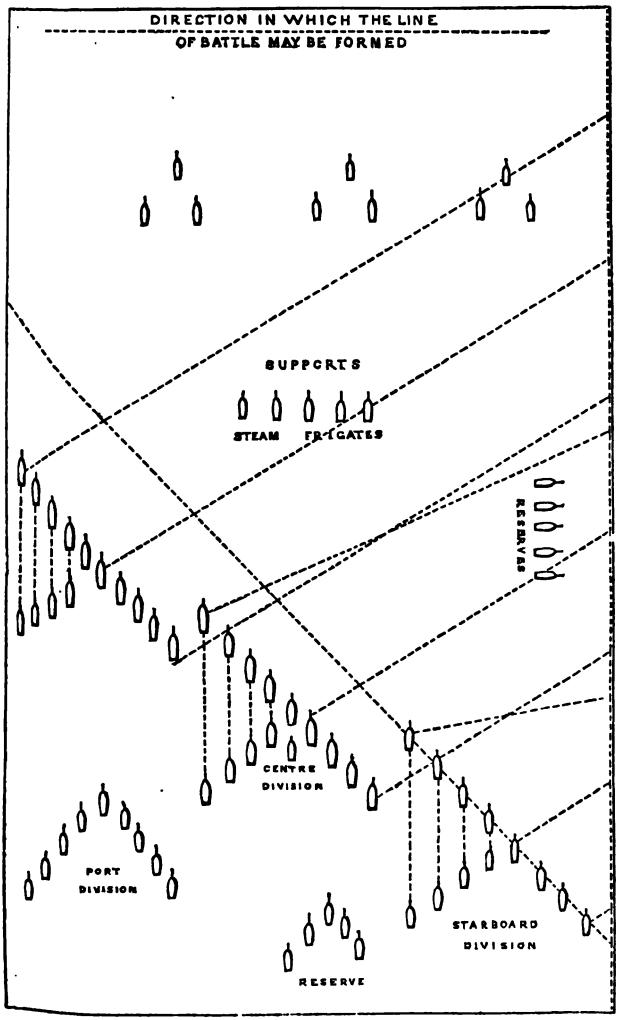
In future actions at sea, the tactics of steamers will be assimilated to those of battalions on shore, and their

movements will admit of being executed with equal precision. But the importance of obtaining the weather-gage, even when all sails are furled, must not be neglected. The smoke from the guns, the soot from the funnels, and the steam from the escape-valves of some fifteen or twenty screw line-of-battle ships, would involve an enemy to leeward, in an almost impenetrable fog, rendering all attempts at precision of fire nugatory, while the ships to windward could take up any position they pleased, and riddle their opponents at a great advantage.

The effect of this state of things was remarkably observable at Acre on the 3rd of November, 1840, on which occasion the wind setting strongly on shore completely blinded the gunners with the accumulated smoke from their own guns as well as that from Sir Robert Stopford's fleet. The result showing a loss of 2000 Egyptians (killed and wounded), contrasted with 12 killed and 42 wounded on the part of the British, will suffice to prove that the advantage of the position of the attacking force arose in no small degree from the cause above adverted to.

Naval forces possess this great advantage over armies on land, in that they are free from all causes of embarrassment arising from inequalities of ground or obstructions on the line of march, and can always be moved in as many columns as there are divisions; and screw liners, even when making a flank movement, can at any time, by a simultaneous evolution, be formed into line of battle.

"The disposition of a fleet in divisions, consisting of double columns *en échelon*, (as shown on the opposite page), in lines of bearing, may be considered," very justly observes Sir H. Douglas, "as the general order of steaming in which


DIRECTION IN WHICH THE LINE
OF BATTLE MAY BE FORMED
SUPPORTS
STEAM FRIGATES
RESERVE
CENTRE
DIVISION
PORT
DIVISION
STARBOARD
DIVISION
RESERVE

a fleet should move, being thus always ready either to meet or to make an attack. In naval as in military tactics, the formations for action depend on various conditions, on the localities, on moral circumstances, on national character, and on the talents of commanders; and it is justly observed by a great tactician, Jomini, that it is a fatal error to attempt the reduction of every system of war to fixed rules, and to cast, as it were, in one mould, all the tactical combinations which a general may have to form."

A very good ordinary formation for the columns of a steam fleet, is in two lines, making an angle of about ninety degrees with each other; the lines being formed on the flagship of a squadron officer. A fleet advancing in divisions, each formed in a double column of ships, in lines of bearing, with proper supports and reserves, possesses very considerable strength from the defence reciprocally afforded to each ship. This order, besides, enables the commander to take immediate advantage of any error of his adversary by the readiness with which he can convert his columns into lines *en échelon*, and form the whole into order of battle in any direction. While *en échelon* the weight of each broadside is increased by the addition of two bow guns on each deck, which are useless while steaming a-head. Again, in the former order, the ships not following in each other's wake are not liable to get foul by drawing a-head or lagging astern, and would thus avoid coming in contact with any wreck that might be drifting from other vessels.

The French enjoy deservedly a high reputation as tacticians both by sea and land; the most important of the original works on the systems of naval and military warfare having emanated from the other side of the Channel;

most of those which have appeared elsewhere being little more than reproductions of these in various forms, often with not very important additions.*

Armed as line-of-battle ships now are with 68-pounder solid shot pivot guns at bow and stern, there is no direction in which a ship of this class cannot train some portion at least of her ordnance, but her bow and stern may be deemed weak when compared with the full power of her broadsides. It is by the converging fire of her entire broadside at close quarters that a vessel of this magnitude exerts the greatest amount of destructive power. Much may be done to weaken it, however, by a steady fire into her ports from large numbers of marines taking steady aim, while they are themselves sheltered by loop-holed barricades. When it is considered that the aperture from which each gun protrudes is not less than three feet square—in some modern vessels it is an open space sixteen square feet—and that immediately in the rear of the gun thirteen or fifteen men are crowded, the havoc and confusion that may be caused by a well sustained small-arm fire poured upon each gun's crew, may be readily imagined.

A compendious pocket volume issued under the authority of the Ministére de la Marine, comprises a general summary of the modern system of French naval

* The reader who is desirous of pursuing the subject of Naval tactics may consult with advantage the following authorities:—Paul Hoste ("Tactiques Navales," 2nd edition, Paris), 1727, very well translated by Captain Boswall, R.N.; M. Bourde de Villehuit, 1769; M. de Moroques, 1780; Clarke, 1790; Le Viscomte de Grenier, 1788; Steele, 1794; Sir Charles Ekins' "Naval Battles;" Le Comte Bouet Willaumez ("Batailles de Mer"); Admiral Bowles' ("Essay on Naval Tactics"), 1846; and, lastly, Sir Howard Douglas's most excellent work, entitled "Naval Warfare under Steam," 1858.

rends and shivers the wood, causing splinters that commit much greater havoc than the shot itself. With concussion and percussion shells, bursting at the point where they strike, and carrying with them their own fragments, together with the fragments of oak they tear away, the effect can hardly be imagined unless it has been actually witnessed. Sir H. Douglas doubts whether it be a wise policy to provide large shell guns for the bow and stern armament of steamers, rather than give them solid shot guns of heavy calibre; as also whether, in the present general armament of the Navy, the number of guns has not been so reduced in proportion to the *displacement*, in consequence of the introduction of shell guns into the broadsides of some classes of ships as to place those vessels in disadvantageous positions, should they ever happen to encounter others equal to them in size, but carrying a greater number of guns. No doubt there is great truth in the observation, because a number of rapid discharges from guns of comparatively inferior calibre, will have a greater effect than a smaller number of rounds from monster guns. The mistake has been already pointed out in the course of the allusions made to the American frigates of the *Niagara* class.

The range, as well as the penetrating power of shot (with equal charges of powder) varies with the square of the velocity, multiplied by the density. Thus a shell filled with lead will cause a much more destructive blow than a solid iron shot of the same diameter, and its flight, with similar elevation, will be greater. As, however, reduction of elevation increases accuracy, equal ranges can be attained by the means indicated with greater precision and with diminished elevation. The greater the weight of a missile, too, the longer is its velocity re-

tained; great initial velocity not being the only essential for the attainment of great range. With a charge of 14 lbs. of powder, the speed of a 56-pound shell filled with lead, and weighing nearly 65½ lbs., will be 492 yards per second, that of a solid iron shot of the same calibre being 532 yards per second; the velocities of balls of similar diameters, but of different weights, being inversely as the square roots of the weights. The velocities of balls of *equal* diameters and weights are directly as the square roots of the charges; or the charges are as the squares of the velocities.

The greatest improvements that have of late been introduced into all firearms, great and small, are mainly attributable to a judicious reduction of windage. The long ranges of Whitworth's and Armstrong's guns more especially exemplify this.

Whitworth's guns are rifled, and of a hexagonal form internally; the projectile is of a longitudinal form, and may be made to fit mechanically in the first instance, or it may be compelled by expansion to adapt itself to the grooves through which it has to pass. It needs no covering, and may be made of any degree of hardness, and either with a flat or pointed extremity. The principle appears to be applicable alike to small arms and to ordnance of any dimensions. Provision is made for any requisite amount of windage, by easing off the half of those sides of the hexagonal bullet on which it rests as it enters the bore. The other halves of the sides being left to preserve a full extent of bearing surface as it leaves the gun. By this means, much of the great aberration to which spherical shot are subject is obviated.

Many considerations have to be taken into account in rifling heavy ordnance, more especially the length and

weight of the gun, the weight of the missile to be pr jected, and the amount of "turn." This last depend much on the length of the gun, and the quantity of pow der to be used. The more rapid the twist (within rea sonable limits) the better; for accuracy of range can onl be ensured by very quick revolutions of the shot on it axis.

To use Mr. Whitworth's words: "For a great rang length of gun is requisite, as it provides for the consump tion of large charges of powder; but the quick turn, whic is so desirable, limits the length that can be used. Th best combinations and proportions can only be arrived a after careful experiment."

Some time since, a number of guns, cast at Woolwich were sent to Mr. Whitworth's works at Manchester t be bored and rifled. In April, 1856, trial was made with a brass 24-pounder of the construction above described The projectiles employed on that occasion varied from two to six diameters in length, and a very rapid rotary motion was communicated to them. The gun itself weighed 13 cwt.; the bore, instead of being of a calibre fitted to receive a spherical 24-pound shot, was only o sufficient capacity to admit one of 9 pounds. The hexa gonal bore measured 4 inches in diameter, and was rather more than 54 inches long. It was entirely finished by machinery, and the projectiles were fitted with mathema tical precision, the spiral in both cases being formed with absolute accuracy. The gun, externally, had only the dimensions of a 24-pound howitzer, but it projected mis siles of 24 pounds, 32 pounds, and 48 pounds each, the ad ditional weight having been obtained by increased length Upon this new system, then, it will be seen that a gun capable, under the old plan, of supporting the strain o

a 24-pound ball, may be made with ease to throw a 48-pound shot; the reduction of the calibre allowing of a sufficient thickness of metal being left to ensure safety. The 32-pound and 48-pound projectiles used in the above experiments, were respectively $11\frac{3}{4}$ and $16\frac{1}{2}$ inches in length. They were pointed at the foremost extremity, being shaped and rounded somewhat like the smaller end of an egg. At the base they were flat, and slightly hollowed towards the centre. The gun was mounted for the occasion upon an ordinary artillery carriage, which showed no symptoms of having been strained, nor of being in any way injured by the concussions to which it had been subjected.

Below are subjoined, in a tabular form, the results of the first series of trials:—

Experiment.	Weight of projectile.	Charge of powder.	Elevation.	Range attained.
1 ...	32 lbs. ...	$2\frac{1}{2}$ oz. ...	45° ...	423 yds.
2 ...	„ ...	3 ...	„ ...	621
3 ...	„ ...	„ ...	„ ...	617
4 ...	48 ...	„ ...	„ ...	420
5 ...	„ ...	5 ...	„ ...	735
6 ...	„ ...	6 ...	20 ...	600
7 ...	„ ...	7 ..	„ ...	687

Subsequently, some further experiments were made with the same gun with reduced elevation, when the projectiles, striking the ground at comparatively short distances, rebounded again and again, till their momentum was expended. The first shot thus fired, weighed 32 pounds, the charge of powder being only 3 ounces, and the gun having an elevation of 2 degrees. The projectile made its first graze at a distance of 92 yards, furrowing the ground for about 7 feet, and leaving distinct indications of its rotary axial motion. It rose again

to an elevation of about 6 feet, grazing, after a further flight of 64 yards. The third graze (owing probably to the hard nature of the soil at the point last struck) was at a distance of 70 yards further; after which it traversed some ploughed land, grazing several times, coming finally to rest after having accomplished altogether a distance of 492 yards.

The second shot also weighed 32 pounds; the charge, as before, consisted of 3 ounces of powder; but this time the elevation given to the gun was 3 degrees. The projectile first grazed the ground at a point 108 yards from the muzzle; the second graze was 126 yards further; but happening to touch the lower bar of an iron fence—a circumstance which appeared to affect its flight—it dropped finally, after having accomplished 490 yards. Some further experiments were then made with shot weighing 48 pounds each.

These very reduced charges rendered it necessary to make use of wooden wads to fill the cavities in the base of the projectiles. This had a tendency to reduce very much the power of the gun.

A further trial with the hexagonal gun was made at Liverpool on the 7th of May. Several shots, varying from 24 to 48 pounds in weight, were fired. The first, weighing 24 pounds, with a charge of 11 pounds of powder, attained a distance of 2800 yards, the elevation given having been 8 degrees. These experiments could hardly be said to have exhibited the *maximum* capacity of the gun, having been interrupted by the rapid rising of the tide. The average range of several 48-pound shots was 3000 yards, but there is little doubt but that a much greater distance will be achieved when Mr. Whitworth has perfected some guns he is now constructing.

A good deal of attention having previously been drawn to the subject of Armstrong's gun, respecting which few particulars had been allowed to transpire, on the 4th of March last, the Secretary-at-War made an official statement to the House, and gave some details as to its alleged capabilities. Without describing its construction, he stated that one piece, throwing a projectile of 18 pounds, weighed* but one-third as much as the ordinary gun of that calibre. With a charge of 5 pounds of powder, a 32-pounder attained a range of $5\frac{1}{4}$ miles; at 3000 yards its accuracy, as compared with that of a common gun, was stated to be in the proportion of 7 to 1. At 1000 yards it had struck the target 57 times successively, and after 1300 rounds the gun showed no symptom of deterioration.† In conclusion, it was said that the destructive effects occasioned by this new ordnance exceeded anything that had been previously witnessed, and that in all probability it was destined to effect a complete revolution in warfare.

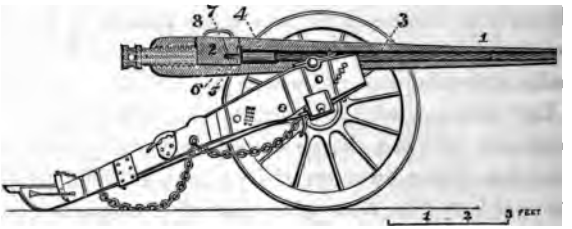
Without going so far as to give an unqualified endorsement to that opinion, it cannot but be conceded that Sir William Armstrong has, after many laborious experiments, produced a very simple, most powerful, and effective arm; but it has yet to be proved whether, of those even now undergoing various preliminary ordeals, this is really the best, every requisite being duly considered.

The figure annexed will give an idea of a field-piece,

* An Armstrong gun, $3\frac{1}{4}$ bore, rather larger in diameter than a 4-pounder, weighs about $11\frac{1}{2}$ cwt., its elongated projectile, 18 lbs. The larger gun of this make, throwing a 32-pound bolt, weighs nearly 18 cwt.

† As regards its penetration, it is reported that it has sent one of its peculiar elongated projectiles, at 1000 yards, through a block of elm 3 feet thick, the bolt ranging after that, 400 yards further.

constructed on this principle, upon an ordinary carriage; it is, however, intended that the Armstrong gun shall be mounted upon a carriage of peculiar construction:



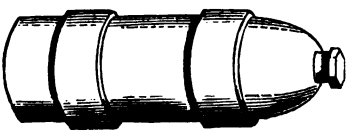
1 indicates the line of sight; 2 is a small moveable chamber or stopper, raised by the handles marked 8 (there may be 2 or more of these moveable stoppers to each gun); 3 is intended to designate the rifled bore; 4, that portion of it towards the chamber, of larger diameter than the rest; 5 is a copper facing affixed to the fore part of the moveable stopper; 6, the cavity for containing a small cartridge by which the large charge is ignited; 7, the touch-hole, set angularly to the bore of the piece. The projection beyond the breech to the left is formed by a powerful screw which locks the chamber (2) firmly in its place. This screw is of slightly larger diameter than the bore, and is perforated longitudinally, to admit the introduction of the charge, of the rammer, &c., or loading rod and sponge. In all the previous published descriptions of these guns, the use of the stopper and also of the breech screw, have been altogether misstated; while no mention has been made of an ingeniously contrived slide, upon which the gun runs back when fired; an important consideration in the case of heavy ordnance, as it enables pieces of that description to be worked with

fewer men than are usually required, and thus very materially utilizes the recoil.

In the diagram, the elevating and depressing screw are not given; there is, besides these, a very simple and admirable arrangement for giving the gun a horizontal motion to the right or left, which could not have been readily shown here.

The internal part of this gun, throughout its entire length (10 ft. 6 in.), was originally formed of steel; the whole gun is now, however, formed entirely of wrought iron. It is a "built-up" gun, that is to say, made of separate pieces, of such dimensions, that they admit of being forged without risk of flaw—the separate pieces being subsequently jumped or welded together. The rifling, consisting of 40 not very deep groovings, makes 1 turn in 12 feet. The bore of the 32-pounder is 3·27 inches. Originally the rifled steel tube was strengthened by 2 ribbons of wrought iron lapped spirally round it when red-hot, and welded one over the other, much in the same way that fowling-piece barrels are manufactured. The projectile used is about 3 diameters long, and was originally covered entirely with sheet-lead, but it is now made with 2 parallel belts of lead (about half an inch thick, and an inch and a half wider) round it, to diminish the windage and preserve the rifling from contact with the iron missile, at the same time that it receives therefrom the requisite rotary motion.

The annexed woodcut represents the form of this



description of projectile. It is scarcely necessary to observe that it is drawn upon a much larger scale than that of the gun.

These projectiles admit of being used as solid shot, shell, or case. They are composed of separate pieces compactly bound together, and may be fired through a mass of oak nine feet thick without being injured. When used as shells, they divide into 50 regular and about 100 irregular pieces. They combine the principles of the shrapnel and percussion shells, and may be made to explode either as they approach the object or as they strike it, as will presently be explained. The reason is, that the shock received in the gun puts the percussion arrangement from half-cock to full-cock, and it will then burst even on striking a bag of shavings. This description of shell may, moreover, be made to explode at the instant of leaving the gun; in which case the pieces spread, and produce the usual effect of grape or canister. In short, it can be caused to explode either at very long or at short distances, and either by the action of the time fuse, or by a blow, and wherever it bursts, it operates like grape. On one occasion two targets, each nine feet square, were placed at a distance of 1500 yards from the gun, and seven shells were fired at them. The effect of these seven shells was, that the two targets were struck in 596 places. Similar effects were on other occasions produced at distances extending to 3000 yards. For breaching purposes, for blowing up buildings, or for tearing open the side of a ship, a different kind of shell is used, the object in that case being to introduce the largest possible charge of powder. Nearly all who have undertaken to enlighten the public on this subject have stated that the grand defect of the Armstrong shell was its small capacity for

powder. Now, had these writers stated that its great advantage was its large capacity for powder, they would have been much nearer the truth; for the fact is, that the 32-pounder shell contains nearly twice the quantity of powder that is contained in a common 32-pounder shell. It has also, besides, been urged, as an objection to this projectile, that it would make but a small hole in passing through the side of a ship. This, however, is the very thing wanted. The shell explodes at the instant it passes through the timber, and the smaller the hole made by penetration, the more confined will be the explosion, and the greater the shattering effect produced. The gun must be judged of, not in relation to the shot, but to the shell, which is beyond comparison the more formidable projectile.

The bore of the gun is slightly enlarged towards the breech, to admit the projectile and the cartridge with the greater facility, the opening through which these are introduced being then closed by the large breech screw already described. The small scale upon which the gun is engraved almost precludes the possibility of showing the precise position of the copper (4) with which the moveable block of metal (marked 2) is faced. It may therefore be advisable to specify that this piece of metal, projects rather more than half an inch into the bore, thereby precluding any escape of gas in that direction at the moment of explosion. The cavity observable in this moveable stopper is, as has been already stated, for the reception of a small cartridge, the fire from which causes the explosion of the main charge.

"Schemers," says Sir William Armstrong, "whose inventions merely figure upon paper, have little idea of the difficulties that are encountered by those who carry

inventions into practice. For my part, I had my full share of such difficulties, and it took me nearly three years of continual application to surmount them. In the height of summer my experiments were carried on at the sea-coast, between the hours of three o'clock in the morning and six. At other seasons I availed myself of the wild moors at Allenheads, and there I had a hut constructed on a mountain ridge, 2000 feet above the sea. My targets were placed upon the opposite side of a deep valley, were nothing more valuable than grouse or lean sheep ran the risk of being shot; and well it was that such was the case, for I had constructed an instrument for maintaining a fire upon an object (a breach, for example) after darkness had set in, and I used to awaken the denizens of the heath by firing shells at my distant target in the middle of the night; and I may observe that, when this instrument was fully perfected, I was enabled to strike a distant object in a pitch-dark night with the same accuracy as in broad daylight. At the end of three years I had succeeded in bringing to maturity both guns and projectiles. Several new guns had been made on my own responsibility, and considerable expense incurred on experiments; but all my disbursements were refunded by the Government as soon as the results were ascertained. I mention this because some misapprehension prevails on the subject; and I take the same opportunity of observing that General Peel, Lord Panmure, and the Duke of Newcastle, the three Ministers of War who have held office since my operations commenced, have at all times afforded me all the countenance I could desire. I have the same acknowledgment to make in regard to all the permanent authorities at the War-office. Early last year a committee was appointed to investigate

the whole subject of rifled cannon. They consisted of officers of great experience in gunnery; and after having given much time for a period of five months to the guns, projectiles, and fuses which I submitted to them, they returned a unanimous verdict in favour of my system. With respect to the precision and range which have been attained with these guns, I may observe that at a distance of 600 yards an object no larger than the muzzle of an enemy's gun may be struck at almost every shot. At 3000 yards a target of nine feet square, which at that distance looks like a mere speck, has on a calm day been struck five times in ten shots. A ship would afford a target large enough to be hit at much longer distances, and shells may be thrown into a town or fortress at a range of more than five miles. But to do full justice to the weapon when used at long distances, it will be necessary that gunners should undergo a more scientific training than at present; and I believe that both the naval and military departments of Government will take the necessary measures to afford the proper instruction both to officers and men. It is an interesting question to consider what would be the effect of the general introduction of these weapons upon the various conditions of warfare. In the case of ships opposed to ships in the open sea, it appears to me they would simply destroy each other, if both were made of timber. The day has gone by for putting men in armour, but I suspect it is only approaching for putting ships in armour. Fortunately, however, no nation can play at that game like England; for we have boundless resources both in the production and application of iron, which must be the material for the armour. In the case of a battery against a ship, the advantage would be greatly in favour

of the battery, because it would have a steady platform for its guns, and would be made of a less vulnerable material, supposing the ship to be made of timber. But, on the other hand, in bombarding fortresses, arsenals, or dockyards, when the object to be struck is very extended, ships would be enabled to operate from a great distance, where they could bid defiance to land defences. In the case of invasion, which is, perhaps, the most interesting case to consider, the possession of such an artillery would be all important to the defenders. It would probably be impossible to effect a landing if opposed even by field batteries of such guns; and if a landing were effected, the retreating force would generally be enabled to avail itself of cover, while the attacking party would have to advance on open ground, where they would be fearfully cut up."

The few wrought-iron guns as yet made upon Sir William Armstrong's plan no doubt range much further and with far greater precision than any ordnance hitherto in use. Being so much lighter than ordinary guns of similar calibre and common construction, they admit of being worked with fewer hands; they are, therefore, much more manageable weapons; but, on the other hand, they are far more costly, and, if generally adopted in both services, it would be some time before a sufficient quantity of these guns could be turned out.

We have yet to learn, whether another and still more recent arm is not likely to prove a formidable rival even to the far-famed Armstrong gun, beautiful and effective as it must be allowed to be. Before entering, however, upon the consideration of any other rifled gun, it may be as well to give a description of the very ingenious concussion fuze above alluded to.

Sir William Armstrong has from time to time patented various very important improvements in the means of firing projectiles. One of these consists of a time fuze, in which the composition is lodged in an annular groove, the continuity being broken by a stop. The duration of the period of its burning, is regulated by causing it to be ignited either at its commencement or at some intermediate point between its extremities. This is managed by means of a revolving cover, fitted with a tightening screw to fix it at any particular point, and containing a passage through which a jet of flame is directed upon the place where the burning of the fuze composition is intended to commence. This jet is produced by the flash of a detonating compound contained in the body of the fuze, and is fired by the penetration of a point actuated by the force exerted on the projectile at the instant of firing the gun. The shell can also be made to burst upon striking an object. This is done by means of a small weight contained in a cylinder within the shell. In this cylinder the weight is fixed by a brittle pin passing through it and the sides of the cylinder also. This pin is cut or broken by the shock which the projectile receives in the gun, at the instant of firing. The weight being thus liberated, advances in its containing cylinder when the shell strikes an object, and causes a patch of detonating composition to be carried against a fixed point, which fires the composition and ignites the bursting charge in the shell. This method of causing the shell to burst on striking a mark is more especially designed for explosive projectiles having a nearly constant axial direction in their flight, and it may be applied either with or without a time fuze.

The annexed cuts show with accuracy these simple but extremely effective arrangements.

FIG. 1.

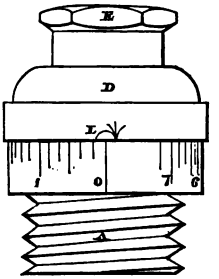


FIG. 2.

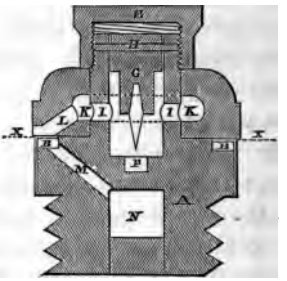


Fig. 1, represents the time fuze complete; fig. 2, is a vertical section of the same through the centre; fig. 3, is a plan of the fuze; and fig. 4, is a horizontal section through the line x x in fig. 2.

FIG. 3

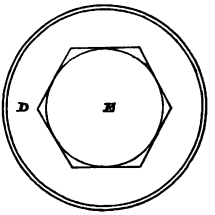
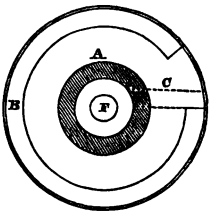


FIG. 4.



Similar letters denote similar parts in all the figures: A is the body of the fuze screwed to fit the shell, and made of any suitable material; B is the annular groove, filled with the fuze composition, its continuity being interrupted by the stop C. The fuze composition is applied as a powder, and is consolidated in the groove by pressure. The com-

position thus compressed is covered with paper. D is the circular cover fitted to revolve on the body of the fuze (this cover may be made of wood or metal); E is the cap whereby the circular cover is fixed in any desired position; F is the detonating composition, contained in a cavity in the body of the fuze; G is a striker armed with a point, and secured in its position until the shell is fired from the gun by the pin H.

On the firing of the gun the striker exerts, by its inertia, a resistance to the motion imparted to the projectile; and the pin, being of inadequate strength to overcome this resistance, is cut or broken, when the striker, being thereby freed, penetrates with its point and ignites the detonating compound. The flame produced by this ignition, fills the chamber containing the striker, and passing thence by two apertures, I, I, into the annular space, K, within the circular cover, is finally directed through the passage, L, on to the fuse composition, which it ignites through the covering paper.

From the point of ignition, the composition burns in opposite directions towards the stop, C. In one direction no effect is produced, the burning being terminated by the stop; but in the other, the flame, on reaching the stop, communicates through the passage, M (filled with gunpowder), with the chamber, N, also containing powder, the explosion of which fires the bursting-charge in the shell. The chamber, N, may be closed by a plug, or by any other suitable means. The body of the fuze is surrounded by a graduated scale for regulating the length of the fuze, which scale has for its zero the termination of the fuze composition at the passage, M. To regulate the fuze, the tightening screw is slackened, and the circular cover turned, until the passage, L, coincides with the

point indicated by the scale for the required range; at which point it is fixed by the re-tightening of the screw. The method of causing the shell to burst on striking an object is exhibited in figures 5, 6, and 7.

FIG. 5.

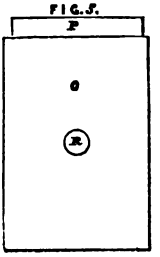


FIG. 6.

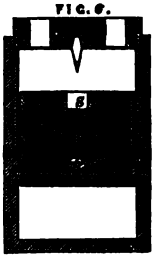
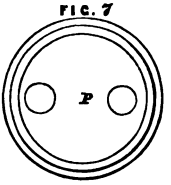


FIG. 7



When thus used, it is termed the percussion fuze. Fig. 5 is an elevation of the percussion fuze complete; fig. 6 is a vertical section through the centre; and fig. 7 is a plan of the same: O is a cylindrical case; P, the cover of the same, having a point projecting inwards, fixed in its centre; Q is a weight fitting the case, and maintained in its position by the pin, R, passing through it and the sides of the case; S is a cavity in the striker, containing a detonating composition. This fuze is placed within the projectile with the cover end in advance. On the firing of the gun, the striker exerts, by its inertia, as in the case of the time fuze, a resistance to the motion of the projectile, and the brittle pin being cut or broken, here-

upon the striker, being liberated, recedes to the back of the case, and remains there until the projectile is checked in its flight by coming in contact with some object. The striker being thus free to move in its case, and preserving its initial velocity, while that of the projectile is diminished, darts forward and explodes the detonating composition, the flame of which, passing through the two holes shown in the cover, fires the bursting-charge of the shell.

A somewhat minute description of the principle of this fuse has been given with a view to counteract an erroneous opinion that has been taken up amongst naval men, to the effect that, as a shell thus fitted would contain within itself the elements necessary for explosion, it might burst either in consequence of a blow, or from an accidental fall; upon a careful consideration of its construction, however, it will be evident that such a contingency is scarcely within the limits of possibility. Besides, whether on board ship or elsewhere, the fuses need not necessarily be fitted to the shell until they are actually required, and the fuse-holes might, till then, be stopped with a wooden tompion or plug. The above misconception, if not removed, might prove seriously prejudicial to this valuable and meritorious invention.

An unworthy attempt having lately been made, in more than one French paper, to rob Sir W. Armstrong of the credit due to his ingenuity, in justice to that gentleman, it may be stated here, that, on investigating the matter, there seems no ground whatever for the pretended claim of a priority of invention as respects his gun.

Messrs. Pétin and Gaudet, iron manufacturers in the South of France, allege that they patented, in 1849, in France and in England, a cannon resembling Sir W. Arm-

strong's in every essential particular, winding up their assertion with a sneer at the manner in which Englishmen are habitually accustomed to rob the countrymen of M. Pétin of the productions of their superior intellects! Now the facts are simply these. After the most diligent search, no patent for any kind of rifled cannon seems to have been granted in either country in 1849, nor even about that time; but a French patent was granted in 1849 to MM. Pétin and Gaudet, for some improvements in the manufacture of iron (des procédés du forgeage du fer), but having no more to do with rifled cannon than it had with petticoat springs. So much for this silly piece of fanfaronade about which such discussion has arisen.

Notwithstanding the high estimation in which Sir William Armstrong's guns are held, and deservedly so from their great intrinsic merit, they have certainly in Mr. Warry's invention a rival, that may eventually be found to eclipse them.

The Armstrong gun cannot be fired oftener than 3 times a minute, and the bore, it is said, has to be constantly sluiced with water; whereas Warry's admits, as has been affirmed, of being discharged 16 or 18 times a minute, or 1000 an hour, without difficulty, though, of course, not without heating, as some reporters have represented. Guns of the former description are expensive, and must be made expressly, by means of special machinery; Mr. Warry, on the other hand, asserts that he can convert every existing gun into a breech-loader upon his principle, and at a moderate outlay; an advantage of the greatest moment at the present time.

This gun is fired by means of a lock. On one side of the breech there is a lever, so contrived, that by one motion of the hand it is made to cock the hammer and

to open the chamber. A second movement closes the chamber again, pierces or cuts the cartridge, places a cap upon the nipple, and fires the gun almost simultaneously.

With a due supply of ammunition, therefore, a destructive torrent of shot and shell may be maintained *ad libitum*. It is not difficult to form a conception of the havoc even one such gun would occasion, if brought to bear upon the head of an advancing column.

The inventor has, besides, made application for a patent for a new coating he has devised for all kinds of projectiles, in lieu of any leaden or metallic covering, which has been found very objectionable in actual practice. The new coating, it is said, reduces the "fouling" to a minimum.

But we cannot turn, even from this very brief consideration of the improvements in modern cannon, without offering a few observations relative to an invention of a different kind, but one that may possibly prove of greater moment than either of the guns that have been described. This is the composition known as "Norton's liquid fire." In the terrific character of its effect, it rivals all that has been recorded of the old Greek fire, at the same time that it is perfectly manageable, and may be projected from an Enfield rifle, from a field-piece, or from heavier ordnance. The composition Captain Norton uses consists of a chemical combination of sulphur, carbon, and phosphorus. He merely encloses this in a metal, or even in a wooden shell, and its effect upon striking the side or sails of a ship, a wooden building, or indeed any object at all combustible, is to cause its instant ignition. This "liquid fire" has apparently the property of penetrating or of saturating any substance against which it may be projected; and such is its affinity for oxygen, that

No.	Nominal calibre of gun	French.		Russian.		Danish.		Dutch.	
		lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
1	50	55	12	...	...	...	...	...	...
2	36*	43	5	32	7·5	39	11·5	...	...
3	30†	34	2	...	...	...	...	...	...
4	24‡	26	10	21	10·5	26	7·8	26	2·3
5	18	19	8·3	16	3·8	19	13·5	19	9·5
6	12	13	1·2	10	13·3	13	3·5	13	1·2
7	8	8	11·3	7	3·3	8	13·3	8	10·5
8	6	6	8·6	5	6·5	6	9·8	6	8·8

* These 36-pounders are 9ft. 7in. long, and weigh 69 cwt.

† There are in the French service three kinds of 30-pounders. No. 1, length 9ft. 3in., weight 59 cwt. No. 2, length 8ft. 6in., weight 49 cwt.; weight of shot for both 34lbs. No. 3 (shell gun), charge of powder with solid shot, 6lbs. 1oz.; with hollow shot, 4lb. 6oz.

‡ The French 24-pounder is 9ft. 4in. long; weight, 41·5 cwt. Besides the above, the French have lately adopted a new 50-pounder, length 10ft. 2in., weight 81 cwt.; as also three other pieces of ordnance—a shell gun, No. 3, weight of shot (80 livres) = 86·33lbs. English. Charge of powder for hollow shot, 5lbs. 9oz.; for solid shot, 5lbs. 12oz.

CHAPTER IX.

THE BOARD OF ADMIRALTY.

General objections to "Boards"—Efficiency of the present Admiralty —Lay First Lords—Their disadvantages—Recent charges against the Admiralty—Explanations—Excess of real above alleged expenditure—Necessarily large outlay on the Navy—Valid charges —Neglected state of the Medway—Corporation of London—How they exercise their conservancy—Chatham as a harbour, deteriorating yearly — Anchors — Admiralty jobbery — Treatment of Mr. Trotman—Cost of anchors—Result of applications to the Admiralty — Treatment of Mr. Macintosh — His invention described—Case of Dr. Williams—Arbitrary and oppressive conduct of the Admiralty towards him — Proper functions of the Admiralty—Shortcomings of that department.

"BOARDS," once wittily remarked Sydney Smith, "are seldom of much use, except to make *screens;*" and a very slight acquaintance with bodies of that kind will suffice to convince most people of the truth of the observation. Where work of importance of any kind has to be executed, the probabilities are, that it will be far better and more satisfactorily accomplished if entrusted to one competent man, who thoroughly understands the business, and will do it fearlessly, than if the same powers were delegated to a committee of half a dozen of conflicting opinions and with different views, each possibly bent on

places at the same time, while her crew will be utterly unable to subdue the flames around them. If we apathetically persevere in neglecting to secure the power thus placed within our reach, there cannot be the least doubt but that our future adversaries, be they who they may, will possess themselves of it, probably to our disgrace and discomfiture.

The new French artillery, having occasioned of late very considerable discussion, may here perhaps be not inappropriately described. These guns, said to be the invention of the Emperor, are at present constructed of two dimensions only: 4-pounders for field-pieces, and 12-pounders for battering-trains. They are two-grooved. It is not intended to fire solid shot from them under any circumstances. Like Armstrong's, already described, the shells used have leaden projections to fill the riflings of the bore. They explode at the moment of striking an object, and the weight and efficiency of the two sized guns above named, is just double that of their nominal calibre.

At a recent trial, fire was opened against a wall of solid masonry by a battery of common 24-pounders at a distance of 45 (English) yards. At the same time, and against a precisely similar wall, a battery of the new 12-pounder ordnance *de précision* was opened at a distance of 90 yards. A breach was effected in a shorter time and at double the distance with the new arm. The 4-pounder weighs, without its carriage, about $5\frac{3}{4}$ cwt., and with a charge of 1 lb. of powder will, with the highest elevation that can be given, send its bolt 4300 yards. The weight of an English light 6-pounder, *with* its carriage, limber, and shot axletree, being 23 cwt. 1 qr. 10 lbs.

The French gun at Vincennes, with every appliance,

and under the most favourable circumstances, will frequently put from 18 to 20 musket-balls, from a cylindrical "case," into a circle 6 feet in diameter, at a distance of 2000 yards; but this is not a performance that can always be reckoned upon, nor is it, after all, a much greater achievement than that of our own light 6-pounder, which, with an elevation of 11°, will throw a shell (weighing 5 lbs. 7¼ oz., and containing 27 balls) from 1950 to 2020 yards; and if the fuze (for the extreme distance being 1·8 in. in length) be carefully adjusted for intermediate ranges, the shell may be made to burst between the two points; whence it will, in addition to the destruction caused by its own fragments, project the dispersed bullets with the same force as if they had been at that spot discharged from so many firelocks.

Tremendous, however, as are the effects of modern artillery, it is universally admitted that the power of that arm is likely to be much held in check by the extended range of rifled small-arms. Incredible though the statement may seem, it is nevertheless an undoubted fact, that in the open field, at any distance from 400 to 800 yards, a six or even a nine-pounder, with all its attendant men and horses, is no match for one expert rifleman. A single marksman, armed with a breech-loader, shifting rapidly from place to place, and taking advantage at the same time of inequalities in the ground, &c., and firing deliberately, could, without much difficulty, pick off every man, and kill or disable successively all the horses attached to the gun, long before it could be brought to bear upon him, even supposing the men serving it had no other object to distract them What, then, it may be asked, would be the effect of the introduction into actual service of Sir Charles Shaw's rifle

battery? This is a very ingenious arrangement, combining almost the range of artillery with the deadly precision of the rifle. It consists of four and twenty rifle barrels, arranged in a frame, serving as a rest, and mounted upon wheels, so as to be capable of being more rapidly moved than a gun, at the same time that it could travel rapidly over roads impracticable for artillery. This rifle battery, weighing only 200 lbs., can be efficiently worked by four men, and probably by half that number, were breech-loaders adopted instead of the regulation weapon; while at 2000 yards, ten of these batteries, weighing 2000 lbs., would, with tolerable certainty, put 200 balls into a target 6 ft. × 2 ft. The 2 flank barrels, having at the breech a divergence of 1-16th of an inch, strike at a distance from each other of 5 yards. The intervening space would therefore be riddled by a shower of 22 bullets. At those exposed points of our coasts, where it would be almost hopeless to attempt to throw up regular earthworks, and where the construction of fortifications would involve incalculable expense, what objection can there possibly be, to providing a few of these light, inexpensive, and at the same time most efficient batteries, requiring, as they would, to work them, but a mere handful of men, whose efficiency would be at least six times that of the same number in the open field.

The colossal wrought-iron gun lately placed in position at Portsmouth contrasts strongly with the light and manageable arm last described. This gun (manufactured by Messrs. Horsfall, at Liverpool,) is placed upon a firm bed of concrete seven feet deep, and stands half way between Southsea and the auxiliary battery. It completely commands the entrance to the harbour; and from the following description it will be obvious that even one

of its "winged messengers" would at short range so damage a vessel, as in all probability to place her *hors de combat*, or at any rate effect irreparable mischief on board.

The following are the dimensions of the gun:—Length from breech-loop to muzzle, 16ft. 6in.; from base-ring to muzzle, 13ft. 8in. Base ring—circumference, 11ft. 4in.; diameter, 3ft. 7½in. Muzzle—circumference, 7ft. 1¼in; diameter, 2ft. 3¼in. Bore—diameter, 1ft. 1in.; length 13ft. 3¼in. Thickness of metal at breech, 1ft. 10in.; at vent, 1ft. 3in.; at muzzle, 7¼in. Trunnions—circumference, 3ft. 1¾in.; diameter, 1ft.; length of shoulder, 11¾in. Distance from centre of trunnions to base-ring, 5ft. 4½in.; to muzzle, 8ft. 3½in. Circumference of gun round the centre piece or band, 12ft. 9in.; weight of gun, 22 tons; weight of shot, 336 lbs.; service charge of powder, 78 lbs. The carriage and platform were manufactured at Woolwich of teak, and are bolted together in the strongest manner. The carriage weighs 3 tons 2 cwt.; he weight of the platform is 4 tons.

There is a trifling flaw at the breech end of this piece of ordnance, most probably occasioned by some of the severe trials to which it has been subjected; but it is not by any means of sufficient importance to militate against the employment of the gun, should a fitting occasion for its use occur.

It is difficult to form any adequate idea of the tremendous strain to which ordnance is subjected when in use; but when it is borne in mind that gunpowder ignited, expands at the rate of 5000 feet per second, and that the elastic fluid generated on the occasion exercises in all directions a pressure equivalent to 13½ tons on each square inch of the internal surface of the bore, we need hardly be surprised to find that guns, constructed

Two millions and a half more for vessels built by contract and purchased; rather more than a million for stores supplied to other departments of Government and foreign Powers; with various other matters; showing an actual total expenditure of 22,313,768*l.* for the eleven years, for which 22,306,937*l.* had been actually voted; exhibiting a real difference of 6831*l.*, instead of 5,000,000*l.* This small difference may be accounted for by the fact, that the expenditure for the year 1858–59 is an estimate based upon the expenditure of the three preceding years, in consequence of the accounts for the present financial year not having been completed up to the present time.

True it is, that the actual, surpasses the alleged expenditure for the years in question, by rather more than 8,000,000*l.* instead of 5,000,000*l.*; but the real question at issue is, not whether a large or small sum was disbursed, but whether the several items of which it is composed were absolutely necessary for the public service. An accurate statement of these is given in Table D in the Appendix. This will at least enable the professional reader, in the case referred to, to judge whether the authorities at the Admiralty have been guilty of reckless extravagance or not.

It must not be forgotten, either, that the years in question included three of war, and that the brunt of the cost of transition from sails to steam fell most heavily upon the above eleven years. With a Navy such as that of England, the annual expenditure must always apparently be not only enormous, but increasing yearly. Every one who has had anything to do with vessels in any form, either as ship-owner or only in the capacity of yachtsman, has necessarily had painful experience of the fact that shipping is a property entailing larger outgoings than

almost any other. If the proprietorship of even a moderate-sized yacht costs a yearly sum which only a handsome fortune can enable its possessor to defray, he at least will hardly express surprise as he peruses the account of the millions upon millions absorbed year by year in the great vortex of the Navy.

So much for misrepresentation, which it is quite unnecessary to resort to, in order to discover really valid charges against the Admiralty management—at least, against that of its rulers to whom, not very long since, the conduct and administration of its affairs were entrusted by the country.

When in 1843 Sir Charles Napier remonstrated in the House of Commons against the absurdity of building five or six iron steamers without previously trying one, the then Secretary to the Admiralty replied with exultation, "We are building forty!" He would have spoken more accurately had he said, "We have *ordered* forty." As it was, however, half a million sterling was spent upon that freak. In July, 1850 (seven years later), Admiral Chads reported, after a long series of experiments and after eighteen iron frigates had been built, that iron was not a proper material for ships of war.

Again, some inherent defect seems to exist in the boilers and engines of nearly all our costly little gunboats. When in commission, they usually require to undergo a thorough repair after very brief service. How different in this respect are the vessels of somewhat similar dimensions in use by private companies; take for instance those almost constantly under way, belonging to the company of watermen.

It is difficult to say precisely what has been the outlay under various heads, in the course of the last twelve or

fifteen years, upon the docks, dockyards, &c., at Chatham, but it cannot have been less than some millions.

Now, a few years ago, a yachtsman,* thoroughly conversant, from long experience, with the Medway in every part, took the trouble, at considerable personal inconvenience and expense, and entirely upon public grounds, to point out to the Admiralty, a fact which it was their bounden duty to have known—namely, that the banks of the Medway were decaying for miles in every direction, that the bed of the river was "silting" up, the "fair-way" becoming sensibly narrower every year, while on either shore a vast morass was forming within forty miles of London; one of the inevitable results of this destruction being, that Chatham would at no very distant period be almost worthless as a dockyard.

In consequence of this gentleman's representations, the Admiralty directed that the river should be re-surveyed, and the officer employed in that duty more than confirmed the statements that had been made.

Time rolled on; nothing further was done by the authorities, but each successive tide was meanwhile increasing the mischief. In order to explain fully the circumstances of the case, it should be premised that near the mouth of most of our tidal rivers, a town has, in the ordinary course of things, sprung into existence, the prosperity of which was intimately connected with the maintenance of proper harbour accommodation, the management of which has usually been confided to the corporations of these ports.

What the consequences of their administration have been may be seen at several of the Cinque Ports, once rich and prosperous cities, now dull and desolate villages.

* Mr. James Chisholm Gooden.

Their ruin has been brought about in various ways—in some cases, by allowing an accumulation of shingle to form a bar at the harbour-mouth, in others by the diminution of the estuaries from natural causes. As the waters shoaled, commerce necessarily receded, till at length it fled altogether, never to return.

The natural action of all water flowing through an alluvial district is to wear away its banks. In a tidal river, this operation of course proceeds more rapidly; at Bishop's Marsh, on the Medway, for instance, a strip of land, the whole length of its river frontage, and 12 feet in width, in the expressive language of the district, annually "goes to sea." On St. Mary's Island—those 284 acres of waste land complacently included by the Admiralty surveyor in Chatham dockyard — the diminution along both sides amounts to as much as 6 or 8 feet a year. In some parts of this river, lower down, the breadth of land from shore to shore is now literally more than four miles. A wilderness of islands, intersected by creeks, inlets, promontories, and every variety of geographical formation, all teeming with decay and redolent of rottenness, extend over hundreds of acres. These islets on the Admiralty chart numbered some 200, and are almost entirely produced by the land having in former times been enclosed and drained. The outer wall once breached, the very system of ditches is sufficient to convert a piece of such land into a series of islands; the ditches become tidal, the severance of one block of land from another is constantly made wider by the action of the water, and the land throughout a large valley covered with this network of corroding watercourses, wastes in all directions.

The Romans originated a regular system of embanking the tidal levels, and wherever any remnant of their work

still remains, it plainly shows the skill and energy which marked all their public undertakings.

In later times, commissions have been instituted for the purpose of sustaining these walls; where the duty has been neglected, disaster has inevitably ensued. In the important instance above alluded to, there is a palpable loss to the country; amounting, in the course of years, to thousands of acres of that county which bears the special designation of the "Garden of England." Here, where golden crops ought to be waving and sheep and cattle grazing, nothing is to be seen but a rank growth of wormwood, samphire, and rushes, polluted with the mud deposited by last night's tide. The isolation of large tracts renders it of comparatively little value, as it is hardly possible to get cattle upon such ground, and a higher tide than usual will every now and then stop only at the foot of the surrounding hills. Even the spring-tides rise high enough to wet the grass and flavour the coarse weeds which thrive there. Such is the desolation of the islets, that they have the appearance of being under the guardianship of the Court of Chancery, and are mown by people who come down from the towns in boats—men who are neither tenants nor owners, yet openly carry away the produce of these lands.

At either end of this uninviting estuary we have, unfortunately, a royal dockyard—Chatham at the upper, and Sheerness at the lower extremity. The duty of conservating this invaluable harbour has been suffered to repose in the hands of the Corporation of the City of London; once in seven years the Lord Mayor for the time being proceeds thither, attended by a rabble rout, to bump the bounds of his charge. This constitutes the only care bestowed by the Corporation on this Queen's highway.

Once a year their Lordships of the Admiralty, on their tour of inspection, graciously vouchsafe a glance at Sheerness and Chatham; but whether or not the official mind is capable of appreciating the extent of the destructive agencies at work is hard to determine. Certain it is that the mischief goes on from day to day with little chance of being arrested.

When Mr. Chisholm Gooden drew the attention of the Government to the desperate prospects of Chatham Dockyard, on which such enormous sums have been expended, the only reply vouchsafed, was a notice of the recent improvements as to the extension of the slip-ways, together with the promise of a letter of thanks from the Lords Commissioners and their then hydrographer; but after the lapse of half-a-dozen years, even this poor acknowledgment, has as yet been actually withheld.

Mr. Gooden's predictions are being rapidly verified. Owing to the shameful neglect of the embankments, he foretold eight years ago that it would soon be impossible to take up a line-of-battle ship to Chatham. On the 9th of last November it was accordingly found impossible for the *Cressy* (80) to proceed thither, and on more than one other occasion vessels of even lighter draught have been compelled to discharge their guns and heavy stores at Sheerness to enable them to proceed up the Medway.

At one time, the judicious outlay of a few hundred thousand pounds would have arrested the further increase of this national loss; now, in order to make Chatham for any length of time available as a dockyard, large votes will be annually required.

According to a statement in the *Times* of the 22nd of March last, a few hundred men were said to have been recently set to work to wall the marshes at St. Mary's

Island. From the same source it appeared that half a million had been *lately* expended in extending and improving the docks and dockyard generally. Most prudent people would have thought that money would have been more satisfactorily laid out in the first instance in rendering the channel of the Medway available for the approach of men-of-war of average draught. If this be not speedily done, it requires no great amount of foresight to predict that ere long some future First Lord will one day find, to his amazement, that he is likely to have one naval station the less under his charge.

Enough has surely been said upon this subject to show that all further expenditure on Chatham must be worse than folly unless its maintenance as a dockyard can be guaranteed. To talk of the conservancy of a navigable river without a judicious system of embankment is equally absurd; but we have not as yet the basis of any general measure to effect that object. What, then, can preserve Chatham and Sheerness for any length of time from complete extinction as water-side towns?

Let us now turn for a moment to the consideration of another subject—that of anchors. It is right that the attention of the public should be called to a little piece of Admiralty jobbery in connexion with that indispensable article of naval equipment. As the narrative is rather instructive to those who supply the Admiralty with their funds, the history of this episode will bear being given somewhat in detail:

In 1852 the then Board of Admiralty appointed a committee, consisting of Admirals Stopford, Mundy, and Hope; Messrs. Aylen and Tonkin (the Master Attendants of her Majesty's dockyards at Sheerness and Portsmouth); Mr. W. S. Lindsay, M.P., Mr. D. Dunbar, Mr.

Anthony Ridley, together with the following members of Lloyd's Committee of Shipping—Messrs. Drew, Phillips, and Marshall, "*To determine the relative merits of different descriptions of anchors.*"

Under the supposition that when public competition is invited by the Government at the expense of individuals, the best invention would indubitably be adopted, eight gentlemen agreed to submit to every test, even to the destruction of their anchors, which accordingly underwent the severest trials. In 1853 the Committee made their formal report, having come to the unanimous decision that Trotman's anchor was the best of all.

That there may be no possible misapprehension on the subject, the precise words of the report are subjoined:—

"The Committee beg to recapitulate the order in which they consider the anchors to stand, together with their relative per-centage of inferiority or superiority to the Admiralty anchor, the value of which (18·17) being taken as the standard or unit.

Trotman . .	1·28 or 28 per cent.	}	Superior to Admiralty anchor.
Rodgers . .	1·26 or 26 „		
Mitcheson .	1·20 or 20 „		
Lenox. . .	1·13 or 13 „		
Porter . .	1·09 or 9 „		
Aylen. . .	1·09 or 9 „		
Admiralty .	1· — the standard."		

What the cost to the other inventors may have been does not appear; but to Mr. Trotman the expense out of pocket, exceeded 400*l.*, and he naturally and reasonably looked forward to being indirectly reimbursed by the adoption of his anchor in the Royal Navy. Six years, however, have elapsed, and after repeated applications to

successive naval administrations, he has sought in vain for the fulfilment of his very reasonable expectations, his anchor having been proved to be the best hitherto produced.

True it is, that, out of consideration for her Majesty, *one* of these anchors was ordered for the royal yacht, *Victoria and Albert*, but with singular inconsistency it still remains excluded from the Fleet, though its use would entail considerably less expense than the antiquated Admiralty anchor,* actually condemned by the Committee as the *very worst* in comparison with those submitted to them.

The subject is of such vital public importance, that it cannot be considered irrelevant to bestow a few moments' consideration upon it here. In doing this, the author disavows all intention of imputing improper motives to the members of the different Boards of Admiralty; he contents himself with stating facts, leaving the public to draw their own inferences. In the first place, then, it happens unfortunately that the whole supply of anchors to the Navy is virtually the monopoly of one individual, under a contract dated as far back as 1841. What his profits amount to, will be best seen by a glance at the following table, which shows the prices of anchors as supplied by the very best makers of the day, those prices being at the same time contrasted with the official scale, as paid by the Admiralty, under the terms of the above valuable contract (specification, proofs, and test precisely the same):—

* It may not be amiss to state here, that the Admiralty anchors are formed and forged piecemeal. The shank, palms, and arms are wrought out of iron bars, hammered together into solid masses called "blooms," and then scarfed together.

Price per ton as per price-lists from the first makers of the day.								Price per ton under Admiralty contract entered into 1841.						
	cwt.	£	s.		£	s.		£	s.		£	s.	d.
Anchors of	20	at 20	10	a ton	20	10	...	at 44	10	a ton	44	10	0
„	25	at 22	0	„	27	10	...	at 44	10	„	55	12	6
„	30	at 22	10	„	33	15	...	at 56	0	„	84	0	0
„	35	at 23	0	„	40	5	...	at 56	0	„	98	0	0
„	40	at 24	0	„	48	0	...	at 56	0	„	112	0	0
„	45	at 24	0	„	54	0	...	at 56	0	„	128	0	0
„	50	at 26	0	„	65	0	...	at 65	0	„	153	0	0
„	55	at 26	0	„	71	10	...	at 65	0	„	178	15	0
„	60	at 28	0	„	84	0	...	at 65	0	„	195	0	0
„	65	at 28	0	„	91	0	...	at 65	0	„	211	5	0
„	70	at 30	0	„	105	0	...	at 73	0	„	255	10	0
„	75	at 30	0	„	112	10	...	at 73	0	„	273	15	0
„	80	at 30	0	„	120	0	...	at 73	0	„	292	0	0
„	85	at 30	0	„	127	10	...	at 73	0	„	310	5	0
„	90	at 30	0	„	135	0	...	at 73	0	„	328	10	0
„	95	at 30	0	„	142	10	...	at 73	0	„	346	15	0
„	100	at 30	0	„	150	0	...	at 73	0	„	365	0	0
Present market price					1428	0	...	Prices paid by the Admiralty			3434	17	6

Thus the market price of the above 17 anchors, from 1 ton, increasing 5 cwt. each, to 5 tons weight, is shown to be 1428*l.* as against 3434*l* 17*s.* 6*d.* paid by the Admiralty.

The annual payment for anchors averages nearly 50,000*l.* a year;* it is therefore an item of sufficient importance to justify this inquiry.

Can any surprise be felt, that the originators of valuable inventions suffering, in the manner just described, from the obstructions vexatiously opposed to them, should revolt at the notion of coming in contact with the class of public servants who manage these matters at the Admiralty, knowing too, as they do, from bitter experience, that, should

* In 1855–56 it was 51,553*l.*, in 1856–57, 44,856*l.*

any change take place in the Administration while any matter is in process of investigation, official routine necessitates that the whole business should be re-commenced before the new Board. When the behaviour of our officials, in reply to applications of the kind alluded to, is contrasted with that of other countries, the comparison is anything but gratifying. The consequence is, that *no one who can avoid it, courts any communication with the naval Lords*, and no doubt many interesting and valuable discoveries are either lost to the public or purchased by other Powers, ever eagerly on the watch and ready to avail themselves with avidity of English ingenuity and English skill.

What a sad history might be compiled of those who, wearied by reiterated applications and harassed by continued rebuffs, have retired in mortification and disgust from the unequal encounter. It would be hopeless to attempt even an outline of such a task within the limits of this work; but a salutary lesson may be drawn from the record of the fate of one who avowedly at one time had the power of curtailing the horrors of the Crimean war, and of checking the effusion of blood so wantonly lavished on that barren peninsula.

In the rejection of the invention of Mr. Macintosh, the War-office shares with the Admiralty the culpable neglect of having neglected the opportunity afforded them of obviating the loss of thousands of lives and millions of treasure, after the perfect feasibility of the scheme had been demonstrated to them.

Captain Norton, Mr. Warry, and Sir William Armstrong, as has been already shown, carry out their hostile operations by means of projectiles of unusual range and by peculiar means of combustion, explosion, and deflagration. Mr. John Macintosh, however, goes to work

in a very different way. He has taken out a patent for "facilitating attacks on strongholds, batteries on shore, and on fleets, dockyards, harbours, towns, and other objects," as well as for the better defence against a hostile approach.

As far back as December, 1854, he applied to the Admiralty, and wrote at the same time to the Duke of Newcastle, who granted him an interview, and, after witnessing several practical experiments in the private gardens of the War Department, expressed his intention of having the matter fully investigated, and directed Captain Sir Thomas Maitland to report upon it.

It will be remembered that at this time the Crimean war was raging; and the Allied Fleets had been repulsed from the fortifications of Sebastopol, the entrance to the harbour was closed by a barrier which it had been found impossible to demolish or remove; yet, notwithstanding this accumulation of adverse circumstances, our inventor boldly undertook to render the stupendous fortresses at the mouth of the port untenable, to destroy the Russian fleet, and to place Sebastopol in a few hours at the disposal of the English and French forces. Every day, at this juncture, was of course of extreme value, and to do him justice, Mr. Macintosh certainly prosecuted his suit with a degree of zeal and energy worthy of a better fate. He has since printed, in rather a bulky pamphlet, the whole of the correspondence that ensued. It is the old, old story—the bland official acknowledgment of communication after communication, so well known to most people who have "done business" with public offices. The curt civility that studiously evades a direct reply; the apparently wilful misunderstanding of a previous inquiry in order to gain time; the employment of phraseology that,

cedure sometimes produces very wonderful results. But, at the same time, if we take into consideration the general condition of the fleet, it is manifest that the effects are not commensurate with the prodigious disbursements it occasions. Thus, we cannot hear, without the greatest astonishment, of the enormous sums sunk in experiments which have turned out complete failures. We have already observed, that in 1815, the English complement was 743 seaworthy ships of war, without taking into account either those on the stocks or transport ships, while the present number is only 546, showing a diminution of 200 vessels. The whole outlay for maritime affairs between 1815 and the outbreak of the Crimean war was 160,000,000*l.* sterling, and as the cost of the *matériel*, as contrasted with that of the *personnel*, is usually reckoned in the proportion of five to four, England must have expended 90,000,000*l.* in this branch during that period. The expenditure in France was very materially less than this. Her Marine has increased, from 1833 to 1857, to the extent of 400 vessels, at an expenditure of 1,660,000,000 francs, which, reckoning upon the above proportion, would give 900,000,000 francs, or 36,000,000*l.* sterling for the cost of material. It is not to be supposed that there are no items in the French budget indicative of imprudence and extravagance, but when placed side by side with that of England it appears a prodigy of economy. [The two following specimens of reckless expenditure will give some idea of the way in which the public money is squandered.] First, then, we find Admiral Napier calling the attention of the First Lord of the Admiralty to the fact, that since 1815, 13 three-deckers, 144 two-deckers, 21 first-class frigates, 155 second-class, and 50 third-class vessels, beside 334 of inferior denomination (in all 717 craft), had utterly disappeared! And on another occasion, Mr. Hume declared from his place in the House of Commons, and without contradiction, that, of 308 ships of war built between 1828 and 1843, one-third were found unfit for service. Startling, however, though such assertions are, they are perhaps surpassed by the extravagant proceedings connected with the building of war-steamers. Though it was as far back as the year 1822 that England first attempted to construct paddle-wheel steamships for purposes of war, it was not till 1840 that she succeeded in producing one that answered its object, and her lines were then taken from those of a French model. We mean the *Terrible*, in building which, the form of the *Gomer*, brought to England by Louis Philippe, was adopted. Still it is but justice to add, that this tardy production far surpassed her prototypes, though it must also be confessed that no less than eight had been previously turned out, all of which

At his own cost, Mr. Macintosh, having freighted a vessel, proceeded to the Crimea while the memorable siege was yet proceeding. He then and there offered to our admirals a ready means of closing a tedious and costly war, and of saving, to use his own words, "eighty millions sterling, and 40,000 to 50,000 valuable lives."

But, for some wise and inscrutable reason, the authorities gave him no encouragement, and, beyond the payment of 1000*l.* towards liquidating a portion of his expenses, he has received no remuneration for all his exertions. It may perhaps be charitably surmised that motives of humanity prevented the adoption of the Macintosh system of warfare—that no compunction was felt at the employment of any of the recognised modes of destruction—at carnage, however great, provided it were but brought about in the orthodox way; and that Lord Panmure and the Lords of the Admiralty recoiled alike from the responsibility of resorting to so extraordinary an agent for crushing our foes. Be that as it may, it is unnecessary at present to discuss the subject further; the facts above stated show that this invention is a very important one, perhaps far more so than might at first sight be imagined. If we do not adopt it, other nations will unquestionably do so; how, then, it may be asked, are future wars to be conducted? Will fair fighting be practicable either by sea or land, if this exaggerated "smoke nuisance" cannot in any way be abated?

Having cited some instances of the mismanagement and incapacity of the Admiralty in the discharge of their more important functions, it may not be amiss to record an instance (not, it is to be feared, a solitary one) in

which a most flagrant act of injustice has been perpetrated by the department in question.

The case adverted to is that of Dr. Thomas T. Williams, who entered the navy in 1807 in the capacity of assistant-surgeon, and by the following year had so acquitted himself as to have been promoted by his own merits to the rank of full surgeon. In that capacity he served at sea for eight or nine years, having in 1816 been placed upon the half-pay list, together with a great number of other officers. He possessed at the time numerous testimonials of the highest character from captains under whom he had served, amongst others from Lord de Saumarez, Lord Gambier, and the Hon. Admiral Gordon.

In 1819 Dr. Williams commenced practice at Chichester, with considerable success. In 1825 he had occasion to visit Paris, where he remained several months. While in that city he received a letter from his agent, acquainting him that the Secretary to the Commissioners for Victualling the Navy had forwarded to him a communication, stating "that the Lords Commissioners of the Admiralty had, by a letter bearing date the 7th of February, 1826, directed the removal of Dr. Thomas Williams from the list of surgeons of the Royal Navy, in consequence of "a certain fraudulent proceeding in which he had been concerned;" that he (the Secretary of the Victualling Board) was "commanded by that Board to say, that Dr. Williams's name had been accordingly struck off the list of surgeons, and that his half-pay ceased from that day."

Dr. Williams lost no time in demanding the nature of the charge thus brought against him in his absence. In reply, he received a second communication from the

Victualling Board, dated 14th April, 1826, informing him that the charge in question was contained in a letter addressed to the Admiralty by a solicitor named Collyer; that this letter had been referred to the Solicitor to the Admiralty, who had reported that the allegations contained in it "were not destitute of foundation;" that upon this report Dr. Williams's name had been struck off the list of surgeons of the Navy; and "that if Dr. Williams had any reply or representation to make with reference to the charge, he ought to do so without delay."

This official document proves conclusively two things: first, that the Board of Admiralty had unjustifiably tried, condemned, and sentenced an individual in his absence, without a hearing; and, secondly, that, after having done so, and not till then, they had called upon him for his defence.

This arbitrary and oppressive proceeding, so deeply affecting the character of the gentleman in question, involved him in such difficulties and distress that he was unable for a considerable time to come back to England. When he did return, he discovered that Collyer, who had been the means of his ruin, had been grossly imposed upon. At the instigation of a personal enemy of Dr. Williams's he had written the letter which had induced the Admiralty to dismiss and disgrace him. Collyer, convinced by conclusive evidence that he had been duped, did all in his power to repair the injury he had occasioned. He addressed to the Admiralty two letters, retracting, in the most unequivocal manner, the charge he had been induced to make against Dr. Williams. In the second, dated 21st December, 1830, he stated that "he had been imposed upon by a malignant personal enemy of Dr. Williams from the worst of motives, that he was con-

vinced of *his entire innocence*, that he deeply lamented having been made the unintentional instrument of his unjust sufferings, and that he trusted his restoration to his rank without prejudice would meet the justice of the case."

Instead, however, of receiving this repentant retractation of Mr. Collyer as a proof of Dr. Williams's innocence, the Lords of the Admiralty coolly, but most unfairly, employed their solicitor in an ineffectual attempt to fasten some fresh charge upon him.

For more than thirty years the victim of this illegal and despotic act has sought in vain for redress. He has presented memorials and petitions without number, but the reply has always been the same. His case was twice brought before the House of Commons by the late Sir Edward Codrington, but on both occasions the Admiralty officials took care to have ministerial majorities at hand to stifle all inquiry. Unhappily, it is to be feared that the above is not a solitary instance of such cruelty and oppression.

The most prejudiced reader, it is presumed, can hardly have perused even the few isolated instances of supineness, mal-administration, and injustice here cited, without having arrived at the conclusion that the Navy of this country is managed by a Board the constitution of which, if not absolutely effete, calls loudly for revision, if not for total reconstruction.

The present moment—the eve of what appears to be likely to prove a general Continental war—does not certainly present the best opportunity for effecting a very great change in the administration of the Admiralty, nor indeed could any material alterations at other times be accomplished without much previous well-matured delibe-

ration. At the same time no more important subject can occupy the attention of our Legislature, nor of those who are really animated by a desire to see a healthy and vigorous administration established and in active operation in every department of the State.

We have plenty of would-be politicians, eager enough to avow themselves on all occasions anxious to redress grievances and to aid in putting down abuses. A noble and an ample field for the exercise of their energies and untried abilities has been here pointed out. They may, in a zealous endeavour to re-create a worn-out institution, find full scope for the display of whatever powers they possess, and have an adequate opportunity of showing what "stuff" they are made of.

The attempt will doubtless be an arduous, and certainly not a very agreeable one, and it is pretty certain to be at first unsuccessful; but if properly directed, must ultimately triumph; and no one can pretend that he who shall zealously and fearlessly lend a hand in rectifying some of the many anomalies and grievances under which the Navy has laboured so long will not have deserved the thanks of the profession as well as of his country.

A few petty changes will not suffice; to be of use, the reformation, whenever it shall be undertaken, must be complete, and extend to every department. The first and most essential one should be the substitution, on the next change of ministry, for the lay First Lord of a naval officer, who, by his professional knowledge, his experience, high character, and, above all, by his administrative ability, shall have especially recommended him as being qualified to undertake the important functions of a Minister of Marine or of a Lord High Admiral.

Let the post in question be the highest prize that can

be conferred upon a happy combination of zeal for the public good, great attainments, and talent, such as may be found united in more than one gallant officer in the British service, whom it might be invidious to particularize by name.

As for the minor changes demanded, it is scarcely necessary, and would occupy too much space, to notify them here. Let it, however, be borne in mind that the ostensible object and only real use of the Board of Admiralty, with all its complicated mechanism, is to maintain, under all circumstances, the elements of such a fleet as the exigencies of the country may at any time demand. Can it be admitted that it has satisfactorily fulfilled this great object? If not, and if the department has been proved to be seriously defective at a juncture when the need might have been more urgent than has as yet happily proved to be the case, the public are clearly justified in calling upon the Legislature to put the Board of Admiralty on its trial, and to remodel it from the very base.

If the capacity of certain previous administrators be referred to, by way of answer to the charge, the defects of the system become only the more palpable and inexcusable from having proved abortive in such hands. This branch of the subject cannot be better closed, than by the introduction of the following observations from an accomplished writer* :—

"A long series of First Lords of acknowledged talent have among them continued to reduce the naval strength of England to about one-half of what the safety of the country requires. There is a parallel in the recent history of the Army and the Navy, which ought to furnish statesmen with ample

* *Saturday Review*, 12th March, 1859.

food for meditation; within a few years two unwelcome discoveries have been made. In the height of a war that taxed our military resources to the utmost, it became all at once apparent that the organization of the Army was radically defective. We have it now on the best authority that the present organization of the Admiralty is at least as faulty as that of the Army before the Russian war revealed its infirmities and prepared the way for future improvements. Our Fleet has been steadily wasting away. It is so far fortunate that the utter failure of the machinery by which the Navy is administered has been detected before the actual outbreak of hostilities. The Admiralty has acknowledged its shortcomings in the past before they have borne fruit in positive disaster; but the comparative cheapness with which this experience seems as yet to have been gained, may render the difficulty of effecting a thorough reform in the management of the Navy even greater than it has proved in the corresponding case of the Army. Almost all that has been done in the improvements of the latter service is due to Mr. Sidney Herbert; and unless some equally resolute reformer shall take the Admiralty under his especial care, there is too much reason to fear that we shall see no effectual improvement in the system under which the sovereignty of the seas has been suffered to pass away from England, and the security of her own shores has become a matter of doubtful speculation.

"Notwithstanding Sir John Pakington's startling admissions, the House of Commons seems to have but half appreciated the real character of the emergency. Admiral Walcot is cheered when he bids us dispossess ourselves of the notion that our naval force is inferior to that of any other power. But there is real danger in blind confi-

dence; and though we have no objection to Admiral Walcot's magniloquent boasts that 'England will be found equal to any crisis,' and that 'our shores will never be polluted by the foot of the invader,' we hope that Parliament will remember that our past immunity has been secured, not by shouting 'Rule, Britannia!' but by maintaining a fleet strong enough on occasion to face the combined Navies of Europe. Sir John Pakington, fortunately, seems more alive to the necessity of unusual efforts than most of his critics in the House. But that which chiefly shakes our confidence in the future is the tone in which the past is spoken of. Now that the Admiralty has pleaded guilty by the mouth of Sir John Pakington, it is forthwith taken for granted that the Fleet has dwindled away without any fault on the part of any one."

CHAPTER X.

CONCLUSION.

THE reader has now in his possession authentic data whereupon to found a tolerably accurate opinion as to the extent of the naval resources of the different Powers of the world. It is obvious that, with the exception of France, none of them can for a moment pretend to vie with this country. With regard to our near neighbour, present ally, and old rival, however, it would seem that her recent vigorous exertions have brought her maritime power more on a par with our own than has perhaps ever been the case before. The present Board of Admiralty have shown, by the preparations lately announced, that they are fully conscious of the necessity of bestirring themselves more energetically than former administrations have done. It would appear that every effort is now being made at the eight great dockyards to place the Royal Navy once more in that position of pre-eminence which befits the maritime character of the country. With regard to the prospects of a rupture with that Power with which we have unhappily been so frequently at war during so many centuries, a few remarks may not be deemed irrelevant. By all thinking men it is conceded, that, so far as the interests of mankind are concerned, few more terrible calamities could befal the civilized world than a war between England and France. That we have been on the eve of such an event more than

once, within the last ten or a dozen years, no one can doubt.

"When the present Government assumed office," said the present Chancellor of the Exchequer, "our pacific relations with France were not a question of weeks, or of days, but of hours."

That this state of things, so alarming and so recent, should recur, is, we fear, far from improbable. That all future differences should terminate as pacifically as the last is scarcely to be expected. Greater complications and difficulties may arise. The only way in which the chances of such a calamity befalling us can be reduced to a minimum is by the unflinching determination on the part of this country, let the cost be what it may, to be in every way thoroughly prepared for the worst. Those who are most conversant with the French character and are best informed as to the views and aspirations of the French nation generally, are clearly of opinion that no hostile attempt will ever be made by our neighbours upon these shores, unless a prospect of success can to some extent be insured by a well-concerted surprise. To keep a watchful eye, therefore, upon the proceedings of the chief dock-yards and arsenals of France, as well as upon the movements of their squadrons and ships, and at the same time never relaxing in our adequate preparations to meet aggression, come where or whence it may, will be nearly tantamount to preventing its occurrence.

Notwithstanding the fiery denunciations occasionally uttered by French officers against a people held by them in such strong aversion, no doubt is ever expressed by the more intelligent of them, that it would be sheer insanity to dream of the invasion of these islands until the dominion of the Channel had been first secured.

"Our great aim, for years back," said a French naval officer, conversing, not long since, somewhat unreservedly with the author upon this topic, "has been gradually to increase our Marine, so as to enable us at any time to be fully upon a par with your country in any contest for maritime supremacy. A resolution formed in the year 1846 determined what our naval policy should be; and although we have had, as you know, many changes since then in our Government, still nothing has occurred to alter the line of action prescribed in the Ordonnance passed twelve years ago. On the contrary, *celui que nous avons maintenant* is as fully bent as any man in this empire can be, upon the humiliation of your country. He considers it his destiny to accomplish that work, and he knows full well that the first blow to be struck is one which must crush once and for ever your naval power. Be assured that he will not be tempted to hurry on matters till he finds himself in a position to fully execute this cherished design with every prospect of prompt success; so as, in fact, to be able to dictate in a few days after striking the blow, such a peace from St. James's Palace as shall best suit the interests and pretensions of France."

This was spoken with no little self-complacency, but with the fullest conviction that the catastrophe thus foreshadowed is destined to occur. Indeed, this belief may be regarded as the main article in the creed of the great body of French officers. On other points they may differ widely, perhaps; but their own superior prowess, and the certainty of their successfully leading one day their eager cohorts in triumph to London, they all agree in regarding as indisputable; the latter event may be retarded, but all the power, wealth, and resources of England will be unable

to avert it. French national vanity has been fostered by the alluring writings of a succession of clever and unscrupulous journalists, whose surest passport to popular favour has, for years past, been to sneer at, abuse, and threaten hapless and "faithless Albion." It has been a constant theme with our *friendly* neighbours to point out the defenceless nature of our coasts, the impossibility of our successfully coping with such an overwhelming force—naval and military—as France will soon be in a position to command; and the equal inability of the untrained and unmilitary population of this country to withstand the overwhelming and thoroughly disciplined legions of France. "What is there to prevent it? Who can hinder us, if we are resolved to chastise the insufferable insolence of those islanders?" observed, not long ago, within the hearing of the author, at a *table d'hôte* at Toulon, a highly-decorated French officer who had served with us in the Crimea. "They had once arrogant pretensions to the dominion of the ocean," continued he, "but, bah! there is an end of all that now—the destiny of France is irresistible—to attempt to oppose it is impious—it is opposing the will of God!"

These and similar sentiments are re-echoed constantly throughout the length and breadth of the land; and are always received with ready assent, if not with hearty acclamation. Lamentable as the fact is, there is no surer way for a Frenchman to obtain applause from an audience of his countrymen, than by indulging in bitter invectives against their unsuspicious, peace-loving neighbours on this side the Channel. At the theatres, a phrase or a word that will bear a construction disparaging to England and the English, is instantly caught up and greeted with rapture by the audience; a newspaper, a pamphlet, a

volume, with a similar bias will receive an additional welcome, should it contain sneers, diatribes, or ill-founded accusations against our country, our people, our institutions. When they have exhausted their stock of stereotyped abuse, they fall back upon the equally hackneyed theme of evil-presage:—

"Destiny has already marked on the dial-plate of Empires, the hour of England's decline." Such is the opinion of the grandiloquent M. Amédée de Césena* expressed not very many weeks ago. We are compassionately told by the same worthy gentleman, that the present state of things may continue for six months or so; but looking still further, he adds, "before 1899, the haughty mistress of the ocean will have sunk to the level of Holland. America and Russia, the two Romes of the future, will long ere then have occupied the vacant space. The British Empire may possibly struggle on for a few years longer, but that it is doomed, and that its palmiest days have set for ever, no reasonable man can doubt."

This rancorous feeling is not confined to the military and naval bodies, the Press, and the lower classes, it pervades the more refined social circles, and frequently oozes out in diplomatic intercourse, and in official documents.

The Commission of 1851, alluded to, on more than one occasion in these pages, before determining the actual strength to be given to the Navy, agreed that it was necessary, first to establish the number of ships that France ought to be able to put to sea the moment that war should be declared. "On this head," said M. Collas, the Secretary, "we have a certain basis. *Our adversary is known,—it can only be England.*" This shows pretty

* Formerly editor of the *Constitutionnel.*

intelligibly, with what view all the augmentations of the French Fleet have since been made.

At the sitting of the Commissioners on the 12th of February, 1851, they came unanimously to the resolution, that 20 first-class, full-power steam-frigates should be constructed with as little delay as possible, and that all other available sailing frigates should be provided with auxiliary propellers; 50 corvettes, with screws, were also to be furnished; 20 large-sized steam-transports were to be constantly held in readiness, to meet any exigencies that might occur. An examination of the dates of the French vessels* built and commenced since that period will show that these resolutions have been more than complied with.

English writers, commenting at the time on the gigantic nature of the projected increase thus recommended, affected to deride the contemplated preparations as impracticable, on account of the enormous expense they would entail. Some even went so far as to demonstrate that the whole of the resources of France, taxed to the utmost, could not accomplish anything like what was then recommended.

From the report of the Commission itself, a very few copies of which have been allowed to escape from official hands, and probably not more than one or two have found their way to this country, it would seem that the intention is, to keep a tolerably strong squadron of reserve at each of the ports of Dunkirk, Havre, Cherbourg, St. Malo, Brest, Lorient, and St. Lazare; to maintain constant communication between all these, by means of fast steam cruisers constantly threatening the British shores,

* Vide Appendix, p. 59.

and thus blockading to a certain extent all our southern and western ports. The reserves are to be sufficiently formidable, to enable a sudden descent to be made upon England, should a favourable opportunity occur, when France shall have resolved to make the spring.

Arguing from the circumstances connected with the rapid and well-organized despatch of troops from Toulon, in 1849, to Civita-vecchia (100 leagues), it is complacently calculated that 10,000 men, with 1200 horses, might, by means of a squadron of 8 steam frigates, 1 corvette of 320 horse power, 1 aviso of 160, and 8 transports, each being towed by a frigate, effect a landing with ease on many parts of the south coast of England. By parity of reasoning, says M. Commissioner Daru, who certainly is explicit enough in giving details relative to the proposed visit, a fleet of thrice the force of that just specified, would with equal facility carry over 30,000 troops and 3600 horses to any part of the United Kingdom. It would, he adds, be necessary, for obvious reasons, to collect the greater portion of this force at Dunkirk, were it intended to threaten the eastern coast; or at Cherbourg, or Brest, were the disembarkation to take place on the southern coast; but Cherbourg, being nearest to Great Britain, would, from the convenience of its position, be the chief rendezvous for the steamers designated for operations across the Channel: for "Cherbourg is," as the Emperor has expressed it, "an eye to watch the opposite shore, and at the same time an arm to strike." Its importance is strongly dwelt upon, in the event of a war with England, by M. Collas, in a special report furnished by him on that subject six years ago. "Let us ever bear in mind," he observes, "that the English are preparing at Alderney the means of destroying Cherbourg. . . . .

"It is absolutely essential," he adds, "that, in case of war, both Cherbourg and Toulon should have the capacity for repairing, as well as for constructing marine engines. To finish the various means of aggression and defence that will ere long give France unquestionable advantages in a struggle, it is undoubtedly requisite to render Dunkirk capable of accommodating a steam squadron. The interests of the nation, require that this port should be put into such a condition as to enable it to render those services which we are justified in anticipating from its admirable locality; to this subject, then, it is incumbent on us to draw the serious attention of the Government."

From a confidential paper, drawn up only a few years since by Admiral Sir Byam Martin for the guidance of the Admiralty, it was shown that, since 1830, "No expense had been spared to render Dunkirk, Calais, and Boulogne, each capable of receiving numerous steamers, and that these ports are so close together as to admit of combined movements on a scale of which few in this country have any conception.

"In what I say with respect to these harbours," continues the gallant admiral, "I have the authority of a respectable and highly intelligent officer in the Queen's service, who, in his official employment, has been in the habit of visiting those ports almost daily for several years, and was continuing to do so at the time I saw him; he therefore requested that his name might not appear in any public document.

"This officer stated that the three harbours, Dunkirk, Calais, and Boulogne, had been so enlarged and deepened as to be capable of receiving more than 100 large war steamers. That Calais can keep 20, constantly afloat in its basin; and the ground in other parts is so soft and level that

300 steamers and transports can rest upon it, without risk or damage, ready to start, when the tide is at half flood; the rise of tide there being 18 feet, and the entrance having been so deepened that there is now 9 feet at low water. It adds much to the importance of these three ports, that they have an inland water communication with the coal mines of Mons and other parts of Belgium, as well as with the great steam-engine factory at Liege. Ostend has been so much enlarged, that it can now keep afloat 40 of the largest war steamers; and in the event of hostilities with France, Ostend will assuredly have to be reckoned as another French port. By means of these improved harbours, the French will be able to assemble so great a number of steamers as may almost fill up the space between Calais and Dover, and always ready to move when the suitable moment arrives for sending forth their invading legions."

The paper in question concludes with this significant remark:—

"With what view so enormous an expense has been incurred, *who can doubt?*"

From the various facts and opinions referred to in the preceding pages, two things are palpable: that the animus existing towards us, on the part of our neighbours, is one of deep-rooted hostility, and that their best energies are being directed, to the surest means of eventually triumphing over us. Unworthy as this is of a great people, and unpalatable as the reflection may be to us, no advantage is to be gained by concealing the fact. In all likelihood, their enmity towards us originated mainly in jealousy of our triumphs, and in envy of our material prosperity. We need trouble ourselves, however, very little about the causes of this animosity, so

14,000,000*l.* a year, and that manifestly against the will of the majority of her population. This senseless policy is the more to be reprehended, as it imposes upon us the necessity for greatly extending our own armaments, thereby adding to the burdens under which industry is already labouring.

But the author is warned, that it is time to draw these lucubrations to a close. They have already far exceeded the limits contemplated in his original design, which was merely to embody the information derived from some most important documents that fortunately came into his possession, with the result of his own careful observations, gathered during a visit to the great naval stations of France.*

This work, though it has finally expanded into a somewhat bulky volume, puts forth but little claim to literary merit, and appeals to public attention upon no other grounds than the national importance of the subject, the great value of the facts collected, and the author's scrupulous endeavours to be candid and truthful.

* For the reason above stated, among others, it has been thought advisable also to omit the remarks originally intended, relative to Volunteer Corps. While these pages are passing through the press, a circular issued from the War-office gives promise of the removal of existing impediments to the organization of that primary element of defence. Any further appeal on the subject, therefore, is, for the present at least, perhaps unnecessary.

APPENDIX.

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Name.	When built.	Guns.	Present station.
FRIGATES (SAILING).			
*Sutlej... 500 horse power.	1855	50	Portsmouth.
*Severn.. ditto.	1856	50	Chatham.
*Phaeton ditto.	1848	50	Sheerness.
*Phœbe... ditto.	1854	50	Devonport.
Worcester ... Effective.	1844	50	Sheerness.
Vernon ..... ditto.	1832	50	Chatham.
Indefatigable ditto.	1848	50	Devonport.
Chichester ... ditto.	1843	50	Sheerness.
Arethusa ..... ditto.	1849	50	Devonport.
Constance ... ditto.	1846	50	Devonport.
Leander ..... ditto.	1848	50	Chatham.
Octavia..... ditto.	1849	50	Devonport.
Nankin ..... ditto.	1850	50	East Indies and China.
Winchester	1822	50	Chatham.
Warspite	1807	50	Chatham.
Vindictive	1813	50	Portsmouth.
Gloucester	1812	50	Chatham.
Alfred	...	50	Portsmouth.
Eagle.....	1804	50	Milford Haven.
America	1809	50	Devonport.
Southampton	...	50	Sheerness.
Conquestador	...	50	Woolwich (powder depôt).
Lancaster	1848	50	Devonport.
Java	1814	50	Portsmouth.
President	....	50	Chatham.
Portland	...	50	Devonport.
Dublin	...	50	Devonport (coal depôt).
Isis	1819	44	Chatham.
Hotspur.....	...	44	Devonport.
Africaine.....	1828	44	Chatham.
Stag	...	44	Devonport.
Endymion	...	44	Devonport.
Mæander	...	44	Portsmouth.
Andromeda	...	44	Devonport.
Leda	1828	44	Devonport.
Nemesis	...	44	Devonport.
Unicorn	...	42	Woolwich.
Thalia	...	42	Portsmouth.
Hamadryad	1823	42	Devonport.
Fisgard	1819	42	Woolwich.
Clyde.....	...	42	Sheerness.
Circe	1827	42	Devonport.
Cerberus	...	42	Devonport.
Sirius	...	42	Portsmouth.

* The ships denoted by an asterisk are being fitted with screws. The Sutlej will be lengthened 46 ft. 6 in. amidships, 13 ft. 9 in. forward, and 13 ft. 4 in. aft.

A

CLASSIFIED STATEMENT

(*Corrected to April*, 1859)

OF THE

ESSELS OF ALL DENOMINATIONS

COMPOSING

THE ROYAL NAVY.

STEAM VESSELS.

SCREW SHIPS OF THE LINE.†

Name.	When built.	Horse power.	Guns.	Tonnage.	Speed per hour in knots.	Present station.
Three-deckers.						
DUKE OF WELLINGTON	•1852	780	131	3771	10·15	Portsmouth.
ROYAL SOVEREIGN	•1857	800	131	3760	...	Portsmouth.
MARLBOROUGH	•1855	800	131	4000	11·06	Mediterranean.
ROYAL ALBERT	•1854	500	121	3726	10·	Chan. Squadron.
WINDSOR CASTLE	1858	engines fitting.	116	3099	...	Devonport.
ROYAL GEORGE	•1827	500	102	2616	9·375	Sheerness.
Two-deckers.						
CONQUEROR ...	1855	800	101	3224	10·806	Mediterranean.
DONEGAL	1859	800	101	3200	...	Devonport.
ST. JEAN D'ACRE	1853	600	101	3200	11·190	Chan. Squadron.
ORION	1854	600	91	3281	12·50	Mediterranean.
PRINCESS ROYAL	1853	400	91	3129	11·031	Mediterranean.
EDGAR	1858	600	91	3094	...	Sheerness.
RENOWN	1857	800	91	3317	10 87	Chan. Squadron.
HERO	1858	600	91	3148	not tried	Sheerness.
ALGIERS	1854	600	91	3168	9·	Chan. Squadron.
AGAMEMNON ...	1852	600	91	3074	11·	Portsmouth.
EXMOUTH	1854	450	91	3083	not tried	Devonport.
VICTOR EMANUEL	1855	600	91	3208	not tried	Mediterranean.
HANNIBAL.....	1854	450	91	3136	8·6	Portsmouth.
JAMES WATT...	1853	600	91	3083	9·361	Devonport.
NILE	1839	500	90	2622	6·854	Queenstown.
ABOUKIR.....	1848	400	90	2627	not tried	Devonport.
CÆSAR	1853	400	90	2767	10·274	North America and West Indies.
*NEPTUNE	...	500	90	2830	...	Portsmouth.
*ST. GEORGE ...	...	500	91	2830	...	Devonport.
*TRAFALGAR...	...	500	91	2830	...	Chatham.
*QUEEN	...	500	86	3240	...	Sheerness.

† The five three-deckers draw from 35 to 36 feet; the twenty-two following two-deckers about 34 feet; the rest about 32 feet.

* The ships denoted by an asterisk are old three-deckers, now in process of conversion, but will be completed this spring (1859). They are ready to receive their engines.

Name.	When built.	Horse power.	Guns.	Tonnage.	Speed per hour in knots.	Present station.
SCREW SHIPS OF THE LINE—*continued.*						
MAJESTIC	1853	400	80	2566	...	Sheerness.
MARS	1853	400	80	2576	...	Sheerness.
MEEANEE (teak)	1849	400	80	2600	...	Sheerness.
CENTURION.....	1844	400	80	2590	8·50	Mediterranean.
BRUNSWICK ...	1855	400	80	2484	7·742	Chan. Squadron.
GOLIATH	1842	400	80	2599	...	Chatham.
CRESSY	1853	400	60	2540	not tried	Sheerness.
COLOSSUS	1848	400	80	2590	9·152	Sheerness.
SANS PAREIL...	1851	400	70	2339	7·05	Devonport.
SCREW COAST-GUARD AND BLOCK SHIPS. (Drawing about 23 feet.)						
BLENHEIM	1813	450	60	1832	5·816	Portland Roads.
EDINBURGH ...	1811	450	60	1772	8·873	Leith.
RUSSELL	1822	200	60	1751	6·68	Falmouth.
AJAX	1809	450	60	1761	6·458	Kingstown.
CORNWALLIS ...	.....	200	60	1809	7·188	The Humber.
HOGUE	1811	450	60	1846	7·809	Greenock.
HASTINGS	1818	200	60	1763	6·702	Liverpool.
HAWKE	1820	200	60	1754	6·525	Coast of Ireland.
PEMBROKE	1812	200	60	1758	7·602	Harwich.
SCREW FRIGATES. (The first ten draw from 32 to 27 feet; the rest from 22 to 20 feet.)						
TOPAZ.....	1858	600	51	2651	not tried	Devonport.
IMPERIEUSE ...	1852	360	51	2355	10·673	Portsmouth.
FORTE.....	1858	400	51	2355	not tried	Sheerness.
SHANNON	1855	600	51	2651	11·807	Portsmouth.
EURYALUS	1853	400	51	2371	...	Mediterranean.
EMERALD	1856	600	51	2913	13·	Sheerness.
LIFFEY	1856	600	51	2658	...	Chan. Squadron.
CHESAPEAKE ...	1855	400	51	2384	10·45	E. Indies & China
MELPOMENE ...	1857	600	50	2857	not tried	Portsmouth.
ORLANDO	1858	1000	50	3700	...	Devonport.
ARROGANT	.....	360	47	1872	8·646	Southampton.
MERSEY	1858	1000	40	3726	13·29	Portsmouth.
AMPHION	1846	300	36	1474	7·14	Chatham.
DORIS	1857	800	32	2479	...	Devonport.
DIADEM	1856	800	32	2479	12·47	North America & W. Indies.
TRIBUNE.....	1853	300	31	1570	10·41	Pacific.
CURAÇOA.....	1854	350	31	1571	10·7	Partic. service.
DAUNTLESS.....	1848	580	31	1575	10·16	Portsmouth.
TERMAGANT ...	1848	310	25	1547	8·78	Portland.

	Horse power.
Lively	60
Louisa	60
Mackerel	60
Magnet	60
Magpie	60
Manly	60
Mastiff	60
Mayflower	60
Midge	20
Misletoe	60
Nettle	20
Nightingale	60
Onyx	20
Opossum	60
Parthian	60
Partridge	60
Peacock	60
Pelter	60
Pert	20
Pet	20
Pheasant	60
Pickle	60
Pincher	60
Plover	60
Porpoise	60
Primrose	60
Procris	60
Prompt	60
Quail	60
Rainbow	60
Rambler	20
Raven	60
Ready	40
Redbreast	60
Redwing	60
Ripple	60
Rocket	60
Rose	60
Ruby	60
Sandfly	60
Savage	60
Seagull	60
Sepoy	60
Shamrock	60
Sheldrake	60
Skipjack	60
Skylark	60
Slaney	80
Snap	60
Snapper	60
Spanker	60
Spey	60
Starling	60
Staunch	60
Stork	60
Surly	60
Swan	60
Swinger	60
Thistle	60
Thrasher	60
Thrush	40
Tickler	60
Tilbury	60
Tiny	20
Traveller	60
Violet	60
Watchful	40
Wave	60
Weazel	60
Whiting	60
Wolf	60
Woodcock	40

CLASSIFIED SUMMARY

OF

THE ROYAL NAVY

TO

APRIL, 1859.

Including Vessels Afloat, Building, or Converting, as also the four Ships of the Line enumerated at p. 43 and four Frigates at p. 44, ordered to be converted.

Description of vessel.	Sailing vessels.	Steamers.			Total.		Grand total.
		Afloat.		Building or converting.			
		Screw.	Paddle.	Screw.	Sail.	Steam.	
SHIPS OF THE LINE	43*	36	...	16§	43	52	95
FRIGATES.....	58†	19	9	10	58	38	96
BLOCK SHIPS	...	9	...	...	...	9	9
MORTAR SHIPS ...	...	4	...	...	...	4	4
CORVETTES AND SLOOPS	72	47	79‡	16	72	142	214
SURVEYING AND SMALL VESSELS.	23	3	24	...	23	27	50
GUN VESSELS	...	26	...	...	...	26	26
GUN BOATS	...	161	...	1	...	162	162
FLOATING BATTERIES	...	8	...	...	...	8	8
TENDERS, ETC.....	...	4	38	...	...	42	42
TROOP AND STORE SHIPS, DEPOTS, TRAINING AND GUNNERY SHIPS.	25	13	2	...	25	15	40
YACHTS	...	1	4	...	...	5	5
TOTAL	221	331	156	43	221	530	751

* The majority of these Sailing Ships of the Line are of very little use, not above 13 or 15 being really effective.

† Of these 58, not more than 14 or 16 can be regarded as serviceable Frigates.

‡ Of these 79, not more than 20 or 24 can be considered available for war purposes.

§ Several of these, now in process of conversion, are in a very forward state. (April, 1859.) Of the Ships of the Line building, one was laid down in 1855, two in 1856, one in 1857, and four in 1858.

TABLE (A),

Showing the Number of Steam Vessels added to the Royal Navy in the Ten Years 1848–58.

Description of vessel.	1848.	1849.		1850.			1851.		1852.		1853.	1854.			1855.			1856.			1857.		1858.		Grand Total.
	Built.	Built.	Purchased.	Built.	Converted.	Purchased.	Built.	Purchased.	Built.	Converted.	Built.	Built.	Converted.	Purchased.	Built.	Converted.	Purchased.	Built.	Converted.	Purchased.	Built.	Purchased.	Built.	Converted.	
Ships of the Line	...	...	...	...	...	...	1*	...	2	...	6*	5*	3†	...	4*	...	...	...	2†	...	2	...	4*	4†	33
Frigates	1	2	...	2	...	...	1	...	1	...	2	1	...	...	2	...	...	3	...	...	2	...	4	...	21
Block Ships.....	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	5	...	...	...	...	...	...	...	...	7
Mortar Ships ...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	4
Corvettes and Sloops	2	4	...	1	...	...	3	1	1	...	1	7	...	3	2	...	...	6	...	...	5	...	3	...	39
Floating Batteries	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	...	3	...	...	...	...	8
Gun Vessels.....	...	...	...	...	...	...	...	...	...	...	...	...	...	8	1	...	4	1	...	14	...	...	...	...	28‡
Gun Boats	...	...	...	...	...	...	...	...	...	...	...	2	...	4	4	...	38	8	...	100	...	6	...	...	162
Troop and Store Ships	...	...	3	...	...	1	...	...	...	...	...	...	...	7	...	...	2	...	1	...	...	...	...	...	14
Tenders, etc. ...	1	1	...	...	...	...	...	...	...	...	...	...	...	9	1	...	20	...	...	6	...	...	...	...	38
Totals.....	4	7	3	3	2	1	5	1	4	1	9	15	3	31	14	5	68	19	6	123	9	6	11	4	354

* Includes vessels built and converted on slip.

† Vessels converted after having been launched.

‡ Only 26 now.

ALPHABETICAL INDEX

TO THE

LIST OF SHIPS COMPOSING THE ROYAL NAVY.

(N.B. The List of Gunboats will be found at p. 49.)

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ALPHABETICAL LIST OF THE INDIAN NAVY IN COMMISSION.

APRIL, 1859.

Name.	Guns.	Description.
ACBAR	22	
ANQUITA	6	Tender.
ASSAYE	10	Paddle.
ASSYRIA	2	Paddle.
AUCKLAND	6	Paddle.
AUSTRALIAN	6	Screw transport.
BEEAS	2	Paddle.
BHEEMAH	4	Tender.
BERENICE ...	2	Paddle troop-ship.
CHARLOTTE	2	
CHEENAB	2	Paddle.
CLIVE	18	
CONSTANCE	3	
CONQUEROR	2	Paddle.
COMET	5	Paddle gunboat.
COROMANDEL	...	Screw transport.
DALHOUSIE	...	Screw transport.
ELPHINSTONE	18	
EMILY	2	Schooner.
EUPHRATES	10	Surveying brig.
FALKLAND	12	
FEROOZ	10	
FRERE	4	Paddle.
GEORGIANA	2	Schooner.
GOOLANAIR	...	Paddle yacht.
INDUS	2	Paddle.
LADY CANNING	4	Paddle.
LADY FALKLAND	2	Paddle.
MAHI	3	Schooner.
MARIE	2	Tender.
NAPIER	2	Paddle.
NERBUDDA	2	Cutter.
NIMROD	2	Paddle.
OUTRAM	2	Paddle.
PLANET	2	Paddle.
POWNAH	2	
PRINCE ARTHUR	...	Screw transport.
PUNJAUB	12	Paddle.
SATELLITE	2	Paddle.
SEMIRAMIS	8	Paddle.
SIR H. HAVELOCK	2	Paddle.
SIR W. LAWRENCE	2	Paddle.
SYDNEY	...	Screw transport.
SNAKE	...	Paddle.
TIGRIS	6	
VICTORIA	4	Paddle.
ZENOBIA	10	Paddle.

*** These vessels are for the most part in an efficient state.

STEAM MEN-OF-

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						SCREW SHIPS OF
B.	LA BRETAGNE	1st.	1200	130	Wood	Brest
T.	L'ALGESIRAS	2nd.	900	90	Ditto	Toulon
Ch.	L'ARCOLE	2nd.	900	90	Ditto	Cherbourg
T.	L'EYLAU	2nd.	900	90	Ditto	Toulon
B.	L'IMPERIAL	2nd.	900	90	Ditto	Brest
Ch.	L'ALEXANDRE	2nd.	800	90	Ditto	Rochefort
T.	LE NAPOLEON	2nd.	900	90	Ditto	Toulon
R.	LE REDOUTABLE	2nd.	900	90	Ditto	Rochefort
Ch.	LA VILLE DE NANTES...	2nd.	900	90	Ditto	.....
						SCREW FRIGATES
B.	L'AUDACIEUSE	1st.	800	58	Wood	Brest
T.	LA FOUDRE	1st.	800	58	Ditto	Toulon
T.	L'IMPERATRICE-EUGENIE	1st.	800	58	Ditto	Ditto
Ch.	L'IMPETUEUSE	1st.	800	56	Ditto	Cherbourg
Lo.	LA SOUVERAINE	1st.	800	56	Ditto	Lorient
T.	L'ISLY	2nd.	650	34	Ditto	Brest
						SCREW CORVETTES
B.	LE D'ASSAS	...	400	16	Wood	Lorient
Lo.	LE DUCHAYLA	...	400	16	Ditto	Ditto
T.	LE LAPLACE	...	400	10	Ditto	Ditto
Ch.	LE PHLEGETON	...	400	8	Ditto	Cherbourg
B.	LE PRIMAUGUET	...	400	8	Ditto	Brest
T.	LE ROLAND	...	400	8	Ditto	Toulon
Ch.	LA REINE-HORTENSE ...	...	320	4	Iron	Havre
						SCREW AVISOS, OR
B.	LE CATON	1st.	260	4	Iron	Toulon
T.	LE CHAPTAL	1st.	220	2	Ditto	Paris
B.	L'AIGLE	1st.	200	4	Wood	Cherbourg
R.	LE LUCIFER	1st.	200	2	Ditto	Rochefort
R.	LA MEGERE	1st.	200	4	Both	Ditto
B.	LE FORBIN	1st.	250		Wood	Brest
B.	LE MONGE	1st.	250		Ditto	Ditto

WAR AFLOAT.

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
THE LINE (FAST).				
Indret	Jan. 1853	17 Feb. 1855	.....	
Toulon	April, 1853	4 Oct. 1855	.....	
Indret	4 March, 1853	20 March, 1855	.....	
M. Cavé	April, 1833	15 May, 1856	.....	
Indret	19 Aug. 1853	15 Sept. 1856	.....	Fitting out March, 1859.
Ditto	30 May, 1848	1857	.....	
Ditto	Jan. 1848	16 May, 1850	.....	
Ditto	4 March, 1853	25 Oct. 1855	.....	
.....	20 June, 1854	1858	.....	
(FAST).				
M. Mazeline	6 June, 1854	22 Jan. 1856	.....	
Le Creuzot	Aug. 1854	2 Dec. 1856	.....	
Ditto	April, 1854	21 Aug. 1856	.....	
M. Mazeline	20 Jan. 1854	15 Aug. 1856	.....	
Ditto	15 May, 1854	3 June, 1856	.....	
M. Cavé	26 Aug. 1846	19 July, 1849	.....	
(FAST).				
Indret	2 Jan. 1852	27 April, 1854	.....	Fitting out March, 1859.
Lorient	Ditto	19 March, 1855	.....	
Le Creuzot	26 July, 1850	3 June, 1852	.....	
Indret	24 April, 1850	25 April, 1853	.....	
M. Mazeline	18 June, 1850	15 Sept. 1852	.....	
Ditto	6 Aug. 1845	5 Sept. 1850	.....	
Le Creuzot	Sept. 1844	20 Dec. 1846	.....	
DESPATCH BOATS (FAST).				
Le Creuzot	20 June, 1844	1 May, 1847	.....	Fitting out.
M. Cavé	July, 1844	9 Dec. 1845	.....	
Cherbourg	16 Sept. 1852	17 Sept. 1853	.....	
Rochefort	12 Feb. 1852	24 May, 1853	.....	
Ditto	7 April, 1852	19 July, 1853	.....	Built on Arman's system.
	Dec. 1856	1858	.....	Fitting out.
	Dec. 1856	1858	.....	Ditto.

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						SCREW AVISOS, OR
Ch.	L'Ariel	2nd.	120	2 M.	Iron	Toulon
Ch.	Le Corse	2nd.	120	4	Wood	Havre
Ch.	Le Faon	2nd.	120	...	Iron	Ditto
Ch.	Le Marceau	2nd.	120	4	Wood	Cherbourg
Ch.	Le Passe-Partout	2nd.	120	2	Iron	Indret
Ch.	Le Pelican	2nd.	120	2	Ditto	Ditto
T.	La Salamandre	2nd.	120	2 M.	Ditto	Toulon
						SHIPS OF THE LINE
T.	Le Friedland	1st.	600	114	Wood	Cherbourg
B.	Le Louis XIV.	1st.	600	114	Ditto	Rochefort
T.	Le Montebello	1st.	140	114	Ditto	Toulon
T.	Le Souverain	1st.	600	114	Ditto	Toulon
T.	La Ville-de-Paris	1st.	600	114	Ditto	Rochefort
Ch.	L'Austerlitz	2nd.	500	90	Ditto	Cherbourg
B.	Le Duguay-Trouin	2nd.	500	90	Ditto	Lorient
T.	Le Fleurus	2nd.	650	90	Ditto	Toulon
T.	Le Navarin	2nd.	650	90	Ditto	Ditto
B.	Le Prince Jerome	2nd.	650	90	Ditto	Lorient
B.	Le Tage	2nd.	500	90	Ditto	Brest
R.	L'Ulm	2nd.	650	90	Ditto	Rochefort
B.	Le Wagram	2nd.	650	90	Ditto	Lorient
B.	Le Bayard	3rd.	450	80	Ditto	Ditto
B.	Le Breslaw	3rd.	500	80	Ditto	Brest
T.	Le Fontenoy	3rd.	450	80	Ditto	Toulon
T.	Le Charlemagne	3rd.	450	80	Ditto	Toulon
Ch.	Le Donawerth	3rd.	450	80	Ditto	Lorient
B.	Le Duguesclin	3rd.	450	80	Ditto	Rochefort
B.	Le Duquesne	3rd.	650	80	Ditto	Brest
B.	Le Jean-Bart	3rd.	450	80	Ditto	Lorient
Ch.	Le Saint-Louis	3rd.	450	80	Ditto	Brest
B.	Le Tilsitt	3rd.	500	80	Ditto	Cherbourg
B.	Le Tourville	3rd.	650	80	Ditto	Brest

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
DESPATCH BOATS (FAST)—*continued.*				
La Ciotat	Jan. 1847	1 Aug. 1848	.....	
Mr. Barnes	1841	Nov. 1842	.....	
Mr. Penn	Bought in 1855	.....	.....	
Indret	20 April, 1850	19 May, 1852	.....	
Ditto	1845	26 March, 1846	.....	
Ditto	April, 1846	1 June, 1847	.....	
La Ciotat	November, 1844	2 Oct. 1847	.....	
WITH AUXILIARY SCREWS.				
Marseilles	1 May, 1812	4 April, 1840	.....	
Mr. Napier	April, 1811	28 Feb. 1854	.....	
Indret	October, 1810	6 Dec. 1812	1852 T.	
Marseilles	1813	25 Aug. 1819	1841 T.	
Ditto	13 June, 1807	5 Oct. 1850	.....	Repairing at Toulon.
Indret	17 Aug. 1832	15 Sept. 1852	.....	
Mr. Napier	17 Sept. 1827	29 March, 1854	.....	Completed, hull and engines.
Le Creuzot	April, 1825	2 Dec. 1853	.....	
Ditto	May, 1832	26 July, 1854	.....	
Ditto	17 Sept. 1827	2 Dec. 1853	.....	
Mr. Napier	26 Aug. 1824	15 April, 1847	.....	Completed, hull and engines.
Indret	13 June, 1825	13 May, 1854	.....	Fitting out March, 1859.
Le Creuzot	22 Feb. 1833	12 June, 1854	.....	Fitting out March, 1859.
M. Mazeline	1 July, 1823	28 Aug. 1847	.....	
Brest	26 May, 1827	31 July, 1848	.....	Fitting out March, 1859.
.....	July, 1827	Nov. 1858	.....	
La Ciotat	Dec. 1833	16 Jan. 1851	.....	
M. Mazeline	27 July, 1827	15 Feb. 1854	.....	
Ditto	20 May, 1823	3 May, 1848	.....	Fitting out March, 1859.
Ditto	4 Aug. 1847	2 Dec. 1853	.....	
Indret	26 Jan. 1849	14 Sept. 1852	.....	
M. Mazeline	13 July, 1848	25 April, 1854	.....	
Brest	2 March, 1832	30 March, 1854	.....	Fitting out March, 1859.
M. Mazeline	26 Aug. 1847	31 Oct. 1853	.....	

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						FRIGATES WITH
R.	LA RENOMMEE (see p. 84)	1st.	200	58	Wood	Rochefort
	L'ENTREPRENANTE	1st.	250	58	Wood	Lorient
Ch.	LA BELLONE	2nd.	200	50	Ditto	Cherbourg
B.	LA DANAE	2nd.	200	50	Ditto	St. Serv.
Lo.	LA DRYADE	2nd.	250	50	Ditto	Lorient
R.	LA PANDORE	2nd.	200	50	Ditto	Brest
R.	LA ZENOBIE	2nd.	200	50	Ditto	Toulon
Ch.	LA CLORINDE	3rd.	200	42	Ditto	Cherbourg
B.	LA POMONE	3rd.	220	37	Ditto	Lorient
						CORVETTES WITH
Ch.	LA BICHE	...	200	4	Iron	Dunkerq.
Ch.	LA SENTINELLE	...	120	4	Ditto	Bordeaux
						AVISOS WITH
Ch.	LE CROISEUR	...	60	2	Iron	Cherbourg
T.	LE RODEUR	...	60	2 M.	Ditto	Ditto
B.	LE LABOURDONNAYE ...	...	35	4 M.	Wood	Brest
						FLOATING BATTERIES
B.	LA CONGREVE	...	225	18	Wood	Rochefort
T.	LA DEVASTATION	...	225	18	Ditto	Cherbourg
Ch.	LA FOUDROYANTE	...	225	18	Ditto	Lorient
T.	LA LAVE	...	225	18	Ditto	Ditto
T.	LA TONNANTE	...	225	18	Ditto	Brest
						SCREW
Ch.	L'AIGRETTE	1st.	110	4	Wood	Havre
T.	L'ALARME	1st.	110	4	Ditto	Toulon
Ch.	L'AVALANCHE	1st.	110	4	Ditto	Havre
Ch.	LA DRAGONNE	1st.	110	4	Ditto	Ditto
T.	L'ECLAIR	1st.	110	4	Ditto	Cherbourg
T.	L'ETINCELLE	1st.	110	4	Ditto	Ditto
T.	LA FLAMME	1st.	110	4	Ditto	Brest
T.	LA FLECHE	1st.	110	4	Ditto	Toulon

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
AUXILIARY SCREWS.				
Le Creuzot	8 July, 1826	28 July, 1847	.....	
M. Mazeline	5 Oct. 1829...	1859.....	.....	
Ditto	26 Aug. 1845	26 March, 1853	.....	
Ditto	27 Sept. 1827	23 May, 1838	.....	Fitting out March, 1859.
M. Mazeline	26 March, 1847	29 Dec. 1856	.....	
Le Creuzot	7 Sept. 1829	26 March, 1846	.....	
Ditto	March, 1828	29 July, 1847	.....	
.....	5 June, 1843	19 Aug. 1845	.....	
M. Mazeline	26 Oct. 1842	20 June, 1845	.....	
AUXILIARY SCREWS.				
M. Belleville	Dec. 1846	3 Sept. 1848	.....	
M. Mazeline	15 Jan. 1847	29 Aug. 1848	.....	
AUXILIARY SCREWS.				
Cherbourg	4 July, 1854	31 July, 1855	.....	
Ditto	19 Nov. 1853	5 Feb. 1855	.....	
Ditto	30 Aug. 1855	17 July, 1856	.....	
WITH SCREWS.				
Le Creuzot	4 Sept. 1854	1 June, 1855	.....	Fitting out March, 1859.
Ditto	5 Sept. 1854	17 April, 1855	.....	
Ditto	20 Aug. 1854	2 June, 1855	.....	
Ditto	Ditto	26 May, 1855	.....	
Ditto	5 Sept. 1854	17 March, 1855	.....	
GUNBOATS.				
Le Creuzot	Dec. 1854	15 May, 1855	.....	
Ditto	Oct. 1854	3 May, 1855	.....	
Ditto	Dec. 1854	26 May, 1855	.....	
Ditto	Ditto	12 May, 1855	.....	
Ditto	26 Nov. 1854	18 April, 1855	.....	
Ditto	Ditto	18 March, 1855	.....	
Ditto	22 Nov. 1854	7 May, 1855	.....	
Ditto	Oct. 1854	10 May, 1855	.....	

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						SCREW
Ch.	LA FULMINANTE	1st.	110	4	Wood	Havre
T.	LA FUSEE	1st.	110	4	Ditto	Toulon
T.	LA GRENADE.....	1st.	110	4	Ditto	Brest
T.	LA MITRAILLE	1st.	110	4	Ditto	Toulon
Ch.	L'ARQUEBUSE.....	2nd.	90	2	Ditto	Nantes
Ch.	LA LANCE	2nd.	90	2	Ditto	Ditto
Ch.	LA POUDRE	2nd.	90	2	Ditto	Ditto
Ch.	LA REDOUTE	2nd.	90	2	Ditto	Ditto
Ch.	LA SAINTE-BARBE	2nd.	90	2	Ditto	Ditto
Ch.	LA SALVE	2nd.	90	2	Ditto	Ditto
Ch.	LA TEMPETE	2nd.	90	2	Ditto	Rochefort
Ch.	LA TOURMENTE.....	2nd.	90	2	Ditto	Ditto
						SCREW
T.	L'ALERTE	...	25	3	Wood	Toulon
T.	LA BOURRASQUE	...	25	3	Ditto	Ditto
T.	LA COULEUVRINE	...	25	3	Ditto	Ditto
T.	LA MEURTRIERE	...	25	4	Ditto	Ditto
T.	LA MUTINE	...	25	3	Ditto	Ditto
T.	LA RAFALE	...	25	3	Ditto	Ditto
T.	LA STRIDENTE	...	25	3	Ditto	Ditto
T.	LA TIRAILLEUSE	...	25	3	Ditto	Ditto
						STEAM TRANSPORTS WITH
R.	LA DORDOGNE	1200	160	4	Wood	Bordeaux
Lo.	LA DURANCE.....	1200	160	4	Ditto	Lorient
R.	LA GIRONDE	1200	160	4	Ditto	Bordeaux
R.	L'ISERE	1200	160	4	Ditto	Rochefort
Lo.	LA LOIRE	1200	160	4	Ditto	Lorient
B.	LA MARNE.....	1200	160	4	Ditto	Brest
Ch.	LA MEURTHE.....	1200	160	4	Ditto	Cherbourg
Lo.	LA MEUSE	1200	160	4	Ditto	Lorient
Lo.	LA NIEVRE	1200	160	4	Ditto	Ditto
R.	LE RHIN.....	1200	160	4	Ditto	Rochefort
B.	LA SAONE	1200	160	4	Ditto	Brest
Lo.	LA SEINE	1200	160	4	Iron	Nantes
Ch.	L'YONNE.....	1200	160	4	Wood	Cherbourg
T.	L'ADOUR.....	900	120	4	Iron	La Seyne
T.	L'ARIEGE	900	120	4	Ditto	Ditto
Ch.	LE LOIRET.....	300	100	4	Wood	Cherbourg

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
GUNBOATS—*continued.*				
Le Creuzot	Dec. 1854	20 May, 1855	.....	
Ditto	Oct. 1854	16 May, 1855	.....	
Ditto	22 Nov. 1854	7 May, 1855	.....	
Ditto	Oct. 1854	24 May, 1855	.....	
M. Gouin	Dec. 1854	4 May, 1855	.....	
Ditto	Ditto	1 May, 1855	.....	
M. Belleville	Ditto	30 April, 1855	.....	
Ditto	Ditto	1 May, 1855	.....	
M. Gouin	Ditto	30 April, 1855	.....	
Ditto	Ditto	4 May, 1855	.....	
Rochefort	7 Dec. 1854	4 April, 1855	.....	
Ditto	Ditto	Ditto	.....	
GUN VESSELS.				
Marseilles	Feb. 1855	9 May, 1855	.....	
Ditto	Ditto	12 May, 1855	.....	
Ditto	Ditto	16 May, 1855	.....	
Ditto	Ditto	30 May, 1855	.....	
Ditto	Ditto	23 May, 1855	.....	
Ditto	Ditto	3 May, 1855	.....	
Ditto	Ditto	27 May, 1855	.....	
Ditto	Ditto	4 May, 1855	.....	
AUXILIARY SCREWS.				
M. Mazeline	Aug. 1854	14 June, 1855	.....	
Ditto	8 Aug. 1854	16 July, 1855	.....	
Ditto	Aug. 1854	30 May, 1855	.....	
M. Nillus	6 Nov. 1854	27 Aug. 1855	.....	
M. Mazeline	1 Aug. 1854	15 June, 1855	.....	
Indret	21 Oct. 1854	16 April, 1855	.....	
Cherbourg	25 Oct. 1854	3 May, 1855	.....	
M. Mazeline	26 Oct. 1854	24 Nov. 1855	.....	
Ditto	Ditto	26 Oct. 1855	.....	
M. Nillus	2 Nov. 1854	29 Aug. 1855	.....	
Indret	21 Oct. 1854	17 April, 1855	.....	
M. Nillus	June, 1855	10 Dec. 1856	.....	
Ditto	28 April, 1855	12 Nov. 1855	.....	
Marseilles	July, 1855	31 May, 1856	.....	
Ditto	Ditto	31 July, 1856	.....	
M. Mazeline	16 Oct. 1855	15 Sept. 1856	.....	

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						STEAM TRANSPORTS WITH
Ch.	La Somme	300	100	4	Wood	Cherbourg
T.	La Zelee	200	60	2	Ditto	Toulon
Lo.	Le Calvados*	1200	250	4	Ditto	Lorient
						STEAM FRIGATES
T.	Le Mogador	...	650	8	Wood	Rochefort
B.	Le Descartes	...	540	20	Ditto	Ditto
T.	Le Vauban	...	540	20	Ditto	Lorient
R.	L'Albatros	...	450	14	Ditto	Rochefort
T.	L'Asmodee	...	450	16	Ditto	Ditto
T.	Le Cacique	...	450	14	Ditto	Lorient
B.	Le Caffarelli	...	450	12	Ditto	Brest
T.	Le Canada	...	450	14	Ditto	Ditto
T.	Le Christophe-Colomb	...	450	14	Ditto	Ditto
Lo.	Le Darien	...	450	14	Ditto	Cherbourg
T.	L'Eldorado	...	450	14	Ditto	Lorient
T.	Le Gomer	...	450	20	Ditto	Rochefort
R.	Le Labrador	...	450	14	Ditto	Toulon
Lo.	Le Magellan	...	450	14	Ditto	Brest
B.	Le Montezuma	...	450	14	Ditto	Rochefort
B.	L'Orenoque	...	450	14	Ditto	Toulon
B.	Le Panama	...	450	14	Ditto	Rochefort
Ch.	Le Sane	...	450	20	Ditto	Cherbourg
T.	L'Ulloa	...	450	14	Ditto	Ditto
						STEAM CORVETTES
R.	Le Berthollet	...	400	10	Wood	Rochefort
R.	Le Catinat	...	400	10	Ditto	Ditto
L o.	Le Colbert	...	320	6	Ditto	Cherbourg
T.	Le Prony	...	320	5	Ditto	Brest
R.	Le Coligny	...	300	4	Iron	Rochefort

* Capable of carrying 2500 men, 150 horses, and

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
AUXILIARY SCREWS—*continued.*				
Cherbourg	16 Oct. 1855	15 Oct. 1856	.....	
Mr. Maudslay	1811	Feb. 1812	1853 T.	
Creuzot	26 April, 1856	1858		
(PADDLE).				
Le Creuzot	16 Nov. 1840	19 Feb. 1848	.....	
Rotterdam	11 Feb. 1840	5 March, 1844	.....	Fitting out March, 1859, at Brest.
Ditto	10 July, 1840	10 March, 1845	.....	
Le Creuzot	Dec. 1841	15 July, 1844	.....	
Mr. Fawcett	19 Oct. 1840	20 Oct. 1841	.....	
Indret	2 Dec. 1840	9 Sept. 1843	.....	
Ditto	17 April, 1845	29 May, 1847	.....	To be fitted out at Brest.
Le Creuzot	18 April, 1841	15 March, 1843	.....	
M. Cavé	26 May, 1841	Ditto	.....	
Ditto	26 Aug. 1841	6 Oct. 1842	1854 B.	
Indret	17 May, 1841	7 Dec. 1843	.....	
Mr. Fawcett	25 Sept. 1840	19 July, 1841	.....	
Le Creuzot	Jan. 1841	7 Aug. 1842	.....	
M. Cavé	26 May, 1841	15 May, 1843	.....	
Arras	June, 1841	28 June, 1843	.....	Fitting out March, 1859.
Le Creuzot	July, 1841	19 Aug. 1843	.....	Fitting out March, 1859, now at Brest.
Arras	Aug. 1841	21 Nov. 1843	.....	Fitting out March, 1859, now at Brest.
Indret	26 Oct. 1840	15 Feb. 1847	.....	
M. Cavé	Ditto	8 Aug. 1842	.....	
(PADDLE).				
Le Creuzot	July, 1849	7 July, 1850	.....	
Rochefort	15 March, 1845	11 Oct. 1851	.....	
Indret	June, 1845	5 May, 1848	.....	
Ditto	2 Jan. 1845	23 Sept. 1847	.....	
Rochefort	27 Sept. 1845	5 Nov. 1850	.....	

1200 tons of stores; 20 of this class are ordered.

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						STEAM CORVETTES
T.	L'Eumenide	...	300	4	Iron	Bordeaux
T.	La Gorgone	...	300	4	Ditto	Ditto
R.	Le Tanger	...	300	4	Wood	Brest
Lo.	La Tisiphone	...	300	6	Ditto	Lorient
						AVISOS
B.	Le Cameleon	1st.	220	6	Wood	Rochefort
Lo.	Le Cassini.....	1st.	220	4 G. 2 M.	Ditto	Lorient
B.	Le Gassendi.....	1st.	220	6	Ditto	Indret
R.	Le Laborieux	1st.	220	2	Ditto	Rochefort
T.	Le Lavoisier	1st.	220	6	Ditto	Indret
Ch.	Le Newton	1st.	220	6	Iron	Cherbourg
B.	Le Souffleur	1st.	220	2	Ditto	Indret
T.	Le Titan	1st.	220	2	Wood	Toulon
T.	Le Veloce.....	1st.	220	6	Ditto	Rochefort
T.	L'Eclaireur.....	1st.	200	2	Iron	Indret
Lo.	Le Goeland.....	1st.	200	4 M.	Ditto	Nantes
T.	Le Heron	1st.	200	4	Ditto	Ditto
Lo.	Le Milan	1st.	200	4	Wood	Cherbourg
T.	La Mouette	1st.	200	2	Iron	La Seyne
Ch.	Le Phenix	1st.	200	4	Ditto	Dunkerq.
B.	Le Promethee.....	1st.	200	4 M.	Ditto	Indret
B.	Le Dauphin	2nd.	180	2	Ditto	Nantes
R.	Le Requin.....	2nd.	180	2	Ditto	Bordeaux
T.	Le Tenare	2nd.	180	4	Wood	Toulon
R.	L'Acheron	2nd.	160	4	Ditto	Rochefort
Lo.	L'Ardent	2nd.	160	4	Ditto	Brest
Lo.	L'Australie.....	2nd.	160	4 M.	Iron	Bordeaux
Lo.	Le Brandon.....	2nd.	160	6	Wood	Lorient
T.	Le Cerbere	2nd.	160	2	Ditto	Indret
B.	La Chimere	2nd.	160	4	Ditto	Ditto
Lo.	Le Cocyte.....	2nd.	160	6	Ditto	Ditto
B.	L'Epervier	2nd.	160	4 M.	Iron	Nantes
T.	L'Euphrate	2nd.	160	2	Wood	Indret
B.	Le Fulton	2nd.	160	2	Ditto	Rochefort
T.	Le Gregeois.....	2nd.	160	2	Ditto	Cherbourg

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
(PADDLE)—*continued.*				
Arras	1 Oct. 1846	23 March, 1848	.....	
Ditto	Ditto	14 Aug. 1848	.....	
Indret	6 Aug. 1847	26 March, 1849	.....	
Lorient	9 Nov. 1847	27 Aug. 1851	.....	
(PADDLE).				
Indret	17 July, 1837	20 Nov. 1839	.....	
Creuzot	10 April, 1843	22 April, 1845	.....	
M. Stehelin	15 June, 1837	27 Sept. 1840	.....	Fitting out March, 1859.
Rochefort	June, 1847	29 July, 1848	.....	
Indret	16 Aug. 1836	4 Oct. 1838	.....	
M. Cavé	3 Nov. 1845	14 Oct. 1848	.....	
Indret	June, 1847	17 Sept. 1849	.....	
M. Cavé	11 Oct. 1842	19 March, 1844	.....	
Mr. Fawcett	15 Sept. 1836	12 March, 1838	.....	
Indret	Dec. 1846	24 Sept. 1847	.....	
MM. Gâche & Voruz	14 May, 1846	3 June, 1848	.....	
M. Cavé	May, 1846	6 Nov. 1847	.....	
M. Mazeline	7 Nov. 1848	4 Oct. 1849	.....	
Marseilles	Oct. 1846	14 Aug. 1847	.....	
M. Nillus	Aug. 1846	3 Sept. 1848	.....	
Indret	Dec. 1846	11 Oct. 1848	.....	
MM. Gâche & Voruz	May, 1845	24 Sept. 1847	.....	
Ditto	15 Jan. 1846	18 March, 1847	.....	
Mr. Powell	July, 1838	3 March, 1840	.....	
Arras	26 Jan. 1835	18 Dec. 1835	.....	
Indret	12 Oct. 1829	22 May, 1830	1841 B.	
Le Havre	26 Feb. 1844	19 Aug. 1844	.....	
Lorient	Ditto	11 April, 1846	.....	
Indret	Feb. 1834	16 Feb. 1836	.....	
Paris	July, 1831	29 Oct. 1833	.....	Fitting out March, 1859.
Lorient	20 May, 1835	7 April, 1837	.....	
Nantes	13 May, 1846	19 June, 1847	.....	
Indret	Jan. 1837	28 April, 1839	.....	
Arras	21 Feb. 1832	6 April, 1833	1844 B.	
Indret	Feb. 1838	17 Jan. 1839	.....	

Port to which the vessel belongs.	Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
						AVISOS
B.	Le Grondeur	2nd.	160	4	Wood	Lorient
T.	Le Meteore	2nd.	160	2	Ditto	Rochefort
T.	Le Narval	2nd.	160	4	Iron	La Ciotat
T.	Le Phare	2nd.	160	4	Wood	Indret
Lo.	Le Sesostris	2nd.	160	4 G. 2 M.	Ditto	Cherbourg
T.	Le Solon	2nd.	160	2	Iron	Indret
B.	Le Styx.....	2nd.	160	4	Wood	Ditto
B.	Le Tartare.....	2nd.	160	2	Ditto	Ditto
Lo.	Le Tonnerre	2nd.	160	4	Ditto	Ditto
T.	Le Vautour	2nd.	160	2 M.	Ditto	Ditto
Ch.	L'Antilope	2nd.	150	...	Iron	Bordeaux
Ch.	Le Chamois	2nd.	150	2	Ditto	Ditto
T.	L'Ajaccio	2nd.	120	2	Wood	.....
Lo.	Le Bisson	2nd.	120	2	Ditto	Lorient
B.	Le Daim.....	2nd.	120	4 M.	Ditto	Nantes
B.	Le Flambeau	2nd.	120	2	Ditto	Brest
Ch.	Le Galilee	2nd.	120	2	Ditto	Lorient
Lo.	L'Anacreon	2nd.	100	2	Iron	Ditto
T.	L'Averne	2nd.	100	2 M.	Ditto	Ditto
R.	Le Voyageur	2nd.	100	4	Wood	Ditto
						STEAM TENDERS
B.	Le Rubis	...	70	2	Wood	La Ciotat
T.	Le Chacal	...	60	2 M.	Ditto	Nantes
B.	Le Dialmath	...	60	...	Ditto	Brest
B.	Le Liamone	...	60	2 M.	Ditto	.....
B.	Le Marabout	...	60	4 M.	Iron	Brest
B.	Le Podor	...	60	...	Wood	Ditto
Ch.	Le Rapide.....	...	60	2	Ditto	Indret
R.	Le Grand-Bassam	...	40	4 M.	Ditto	Rochefort
Ch.	Le Basilic	...	30	2 M.	Iron	Cherbourg
Ch.	Le Serpent	...	30	2 M.	Ditto	Paris
R.	L'Econome.....	...	25	2 M.	Wood	Rochefort
R.	Le Surveillant	...	25	2 M.	Ditto	Ditto
Ch.	L'Akba	...	20	2 M.	Iron	Havre
B.	L'Oyapock	...	20	2 M.	Wood	Brest

Engines where or by whom constructed.	Keel when laid down.	When launched.	Date of last important alterations.	Observations.
(PADDLE)—*continued.*				
Rouen	9 June, 1837	16 March, 1839	.....	
Arras	1 Jan. 1833	28 Oct. 1833	.....	
La Ciotat	16 Aug. 1843	29 Sept. 1844	.....	
Indret	June, 1833	14 March, 1835	.....	
Arras	21 Aug. 1835	27 Aug. 1836	.....	
Indret	May, 1845	8 Aug. 1846	.....	
Ditto	June, 1832	17 Sept. 1834	.....	
Ditto	1834	14 July, 1836	.....	
Paris	13 March, 1836	21 Feb. 1838	.....	
Indret	Oct. 1830	7 July, 1834	.....	
Creuzot	Bought in 1855	.....	.....	
Ditto	Ditto	.....	.....	
.....	Bought in 1850	.....	.....	
Lorient	3 July, 1849	25 July, 1850	.....	
MM. Gâche & Voruz	14 Oct. 1848	5 July, 1849	.....	
Cherbourg	20 Feb. 1832	3 June, 1837	1844 Ch.	
Lorient	3 July, 1849	12 Aug. 1851	.....	
Ditto	17 June, 1845	2 Nov. 1846	.....	
Ditto	Feb. 1847	17 June, 1848	.....	
Rochefort	Jan. 1841	30 Sept. 1841	.....	
(PADDLE).				
Lorient	1843	Bought in 1844	.....	
Mr. Maudslay	Ditto	Ditto	.....	
Brest	10 March, 1855	14 Aug. 1855	.....	
Mr. Maudslay	.....	Bought in 1844	.....	
Ditto	11 March, 1851	1 July, 1852	.....	
Brest	10 March, 1855	14 Aug. 1855	.....	
Indret	June, 1840	21 July, 1841	.....	
Rochefort	March, 1852	1 July, 1852	.....	
M. Cavé	20 Sept. 1852	26 Sept. 1854	.....	
Ditto	July, 1851	20 Jan. 1852	.....	
Rochefort	17 Oct. 1854	3 April, 1855	.....	
Ditto	Ditto	Ditto	.....	
M. Nillus	Sept. 1853	15 April, 1854	.....	
Brest	18 June, 1851	3 May, 1852	.....	

MEN-OF-WAR AFLOAT,

Port to which the vessel belongs.	Name of vessel.	Rate.	Guns.	Whether wood or iron.	Hull where built.
					LINE-OF-
B.	LE VALMY	1st.	114	Wood	Brest
B.	L'HERCULE	2nd.	90	Ditto	Toulon
Ch.	LE JEMMAPES	2nd.	90	Ditto	Lorient
B.	LE TURENNE	2nd.	90	Ditto	Rochefort
T.	L'IENA	3rd.	82	Ditto	Ditto
B.	L'INFLEXIBLE	3rd.	82	Ditto	Ditto
R.	LE JUPITER	3rd.	80	Ditto	Cherbourg
T.	LE NEPTUNE	3rd.	80	Ditto	Lorient
T.	LE SUFFREN	3rd.	82	Ditto	Cherbourg
T.	L'ALGER	4th.	70	Ditto	Toulon
T.	LE DUPERRE	4th.	70	Ditto	Brest
T.	LE MARENGO	4th.	70	Ditto	Lorient
T.	LE TRIDENT	4th.	70	Ditto	Toulon
T.	LA VILLE-DE-MARSEILLE	4th.	70	Ditto	Ditto
					FRIGATES
Lo.	L'ANDROMAQUE	1st.	56	Wood	Lorient
T.	LA BELLE-POULE	1st.	56	Ditto	Cherbourg
B.	LA DIDON	1st.	56	Ditto	Toulon
Ch.	LA FORTE	1st.	56	Ditto	Cherbourg
T.	L'INDEPENDANTE	1st.	56	Ditto	Ditto
T.	L'IPHIGENIE	1st.	56	Ditto	Toulon
B.	LA PERSEVERANTE	1st.	56	Ditto	Brest
B.	L'URANIE	1st.	56	Ditto	Toulon
Lo.	LA VENGEANCE	1st.	56	Ditto	Lorient
B.	L'ALCESTE	2nd.	52	Ditto	Cherbourg
B.	L'ANDROMEDE	2nd.	52	Ditto	Lorient
B.	LA CLEOPATRE	2nd.	38	Ditto	St. Servan
B.	LA NEMESIS	2nd.	46	Ditto	Brest
B.	LA NEREIDE	2nd.	52	Ditto	Lorient
Lo.	LA POURSUIVANTE	2nd.	52	Ditto	Toulon
B.	LA REINE-BLANCHE	2nd.	52	Ditto	Cherbourg
B.	LA SIBYLLE	2nd.	52	Ditto	Toulon
B.	LA SIRENE	2nd.	52	Ditto	Ditto
R.	LA VIRGINIE	2nd.	52	Ditto	Rochefort
B.	L'AFRICAINE	3rd.	42	Ditto	St. Servan
B.	L'ALGERIE	3rd.	42	Ditto	Rochefort
T.	LA CONSTITUTION	3rd.	42	Ditto	Brest

SAILING VESSELS.

Keel when laid down.	When launched.	Date of last important alterations.	Observations.
BATTLE SHIPS.			
1 March, 1838	25 Sept. 1847	.....	
1824	29 July, 1836	.....	To be converted.
26 April, 1825	2 April, 1840	.....	Ditto.
18 June, 1827	15 April, 1854	.....	Fitting out April, 1859.
6 April, 1805	30 Aug. 1814	1846 B.	
18 Aug. 1827	21 Nov. 1839	.....	
5 Nov. 1811	22 Oct. 1831	1845 B.	
1 Dec. 1810	21 March, 1818	1836 B.	
21 Aug. 1824	27 Aug. 1829	1839 B.	Carries 6 rifled guns
1812	26 May, 1815	1834 T.	
15 Oct. 1813	25 Aug. 1824	1845 T.	
19 Sept. 1806	12 Oct. 1810	1835 T.	
Nov. 1809	9 June, 1811	1843 T.	
27 June, 1811	15 Aug. 1812	1841 T.	
(SAILING).			
29 May, 1827	8 March, 1841	.....	
1 April, 1828	26 March, 1834	.....	
March, 1825	15 July, 1828	.....	
5 June, 1829	16 Sept. 1841	.....	
1824	28 June, 1828	1841 T.	
Aug. 1824	3 May, 1827	1851 T.	
1 Oct. 1829	28 June, 1847	.....	
Sept. 1826	28 July, 1832	.....	
5 Oct. 1829	1 July, 1848	.....	
26 May, 1829	28 March, 1846	.....	
2 April, 1827	5 April, 1833	1849 B.	
1 Sept. 1827	23 April, 1838	1851 B.	
14 Sept. 1828	14 April, 1847	.....	
1 Aug. 1828	17 Feb. 1836	.....	
5 May, 1827	16 Nov. 1844	.....	
27 June, 1830	15 Sept. 1837	.....	
Sept. 1829	7 Nov. 1847	.....	
July, 1820	25 July, 1823	1851 B.	
26 June, 1827	25 April, 1842	.....	
1 Feb. 1835	9 Aug. 1839	1852 B.	
26 Oct. 1844	4 March, 1848	.....	
26 July, 1833	6 Aug. 1842	.....	

Port to which the vessel belongs.	Name of vessel.	Rate.	Guns.	Whether wood or iron.	Hull where built.
					FRIGATES
B.	L'Erigone	3rd.	42	Wood	St. Servan
T.	L'Heliopolis	3rd.	42	Ditto	Rochefort
B.	L'Isis	3rd.	42	Ditto	Brest
Lo.	La Jeanne-d'Arc	3rd.	42	Ditto	Lorient
Lo.	La Penelope	3rd.	42	Ditto	Ditto
B.	La Psyche	3rd.	42	Ditto	Brest
					CORVETTES
Ch.	L'Artemise	1st.	26	Wood	Lorient
Ch.	La Bayonnaise	1st.	22	Ditto	Cherbourg
T.	La Capricieuse	1st.	22	Ditto	Toulon
R.	La Constantine	1st.	22	Ditto	Rochefort
R.	L'Embuscade	1st.	22	Ditto	St. Servan
T.	L'Eurydice	1st.	22	Ditto	Cherbourg
B.	La Galathee	1st.	22	Ditto	Brest
B.	La Serieuse	1st.	22	Ditto	Ditto
Lo.	La Thisbe	1st.	22	Ditto	Lorient
T.	La Bergere	2nd.	12	Ditto	Toulon
B.	La Brillante	2nd.	16	Ditto	Ditto
T.	La Danaide	2nd.	16	Ditto	Ditto
Ch.	La Prevoyante	2nd.	12	Ditto	Lorient
B.	La Sarcelle	2nd.	12	Ditto	Rochefort
R.	La Triomphante	2nd.	16	Ditto	Cherbourg
					BRIGS
B.	L'Adonis	1st.	12	Wood	Toulon
B.	L'Alcibiade	1st.	12	Ditto	Ditto
Ch.	Le Beaumanoir	1st.	12	Ditto	Cherbourg
B.	Le Chasseur	1st.	12	Ditto	Lorient
Lo.	Le Ducouedic	1st.	12	Ditto	Toulon
R.	L'Entreprenant	1st.	12	Ditto	Rochefort
B.	Le Faune	1st.	12	Ditto	Brest
B.	Le Genie	1st.	14	Ditto	Ditto
Lo.	Le Hussard	1st.	12	Ditto	Rochefort
T	Le Janus	1st.	12	Ditto	Toulon
B.	Le Lapeyrouse	1st.	12	Ditto	Lorient
B.	Le Meleagre	1st.	12	Ditto	Ditto
Lo.	Le Mercure	1st.	12	Ditto	Brest
B.	Le Nisus	1st.	12	Ditto	Ditto
Ch.	L'Obligado	1st.	12	Ditto	Cherbourg
T.	L'Olivier	1st.	12	Ditto	Toulon

Keel when laid down.	When launched.	Date of last important alterations.	Observations.
(SAILING)—*continued.*			
25 Sept. 1832	25 Sept. 1836	1851 B.	
Aug. 1830	25 Aug. 1847	.....	
3 Aug. 1846	29 July, 1851	.....	
26 July, 1835	8 Nov. 1847	.....	
1 Sept. 1830	25 Nov. 1840	.....	
14 June, 1842	28 Sept. 1844	.....	
(SAILING).			
21 Aug. 1844	19 Nov. 1846	.....	
31 July, 1844	7 Sept. 1846	1852 Ch.	
Oct. 1837	5 July, 1849	.....	
6 Oct. 1846	10 Oct. 1851	.....	
1 Sept. 1832	20 May, 1837	.....	
22 Sept. 1846	23 May, 1849	.....	
16 Feb. 1844	27 Dec. 1845	.....	
24 March, 1847	1 Aug. 1848	.....	
Ditto	9 Jan. 1849	.....	
July, 1832	3 Jan. 1834	.....	
July, 1828	20 Aug. 1830	.....	
Sept. 1830	13 June, 1832	.....	
11 March, 1833	6 Aug. 1834	.....	
26 Aug. 1833	28 May, 1838	.....	
14 June, 1830	4 Sept. 1834	.....	
(SAILING).			
June, 1825	12 Feb. 1827	1845 B.	
1825	27 March, 1826	1846 B.	
19 Jan. 1850	2 Dec. 1853	.....	
26 May, 1847	31 July, 1848	.....	
14 March, 1828	26 Sept. 1829	1841 T.	
June, 1846	20 Jan. 1849	.....	
5 June, 1846	17 April, 1847	.....	
13 July, 1841	23 June, 1842	.....	
7 Dec. 1825	25 June, 1827	1848 B.	
Aug. 1847	21 Nov. 1848	.....	
6 Oct. 1830	30 July, 1832	1843 B.	
26 May, 1828	7 July, 1830	1845 L.	
26 July, 1841	25 May, 1842	.....	
11 June, 1849	14 May, 1850	.....	
26 Aug. 1848	10 July, 1850	.....	
July, 1843	28 Dec. 1844	.....	

Port to which the vessel belongs.	Name of vessel.	Tons.	Guns.	Whether wood or iron.	Hull where built.
					SCHOONERS, CUTTERS, AND
...	LA KAMEHAMEHA	...	2	Wood	Cherbourg
R.	LA LABORIEUSE	...	...	Ditto	Rochefort
B.	LA MOUCHE	...	4	Ditto	Cherbourg
Ch.	LA NU-HIVA	...	2	Ditto	.....
...	LA PAPEITI	...	2	Ditto	.....
R.	LA POURVOYEUSE.....	...	...	Ditto	Rochefort
...	LA SAKALAVE	...	...	Ditto	Nossibé
Ch.	LE TANE-MANOU	...	2	Ditto	.....
T.	LA TOPAZE	...	2	Ditto	Toulon
B.	LA TURQUOISE	...	2	Ditto	Lorient
R.	LA VIGILANTE	...	...	Ditto	Rochefort
B.	LE CAPELAN.....	...	2	Ditto	Cherbourg
B.	L'ECUREUIL, No. 1.....	...	2	Ditto	Ditto
B.	L'ECUREUIL, No. 2	...	2	Ditto	.....
B.	L'ESPIEGLE	...	2	Ditto	Cherbourg
Ch.	LE FAVORI.....	...	4	Ditto	Ditto
Ch.	LE LEVRIER	...	2	Ditto	Ditto
Ch.	LE MIRMIDON	...	2	Ditto	Ditto
B	LE MOUSTIQUE	...	2	Ditto	Ditto
Ch.	LE PLUVIER	...	2	Ditto	Ditto
T.	LE BOBERACH	...	2	Ditto	Algiers
Lo.	LE BLAVET	...	2	Ditto	Lorient
					MORTAR
Ch.	LA BOMBE.....	...	2 M.	Wood	Lorient
Ch.	LA FOURNAISE	...	2 M.	Ditto	Ditto
Ch.	LE TOCSIN	...	2 M.	Ditto	Ditto
Ch.	LA TORCHE	...	2 M.	Ditto	Ditto
Ch.	LA TROMBE	...	2 M.	Ditto	Ditto
					TRANSPORTS
B.	L'ARMIDE	800	2	Wood	Lorient
B.	LA CARAVANE	800	4	Ditto	Toulon
T.	L'EGERIE	800	4	Ditto	Bayonne
B.	LA FORTUNE	800	4	Ditto	Toulon
Ch.	L'INFERNAL	800	6	Ditto	Rochefort
T.	L'OISE.....	800	2	Ditto	Toulon
T.	LA PROSERPINE.....	800	2	Ditto	Eng. Prize
B.	LE MARSOUIN	600	2	Ditto	Brest

Keel when laid down.	When launched.	Date of last important alterations.	Observations.
(SAILING)—*continued.*			
Sept. 1838	29 July, 1840	.....	To be fitted out forthwith March, 1859.
Ditto	29 July, 1841	.....	
16 May, 1831	11 July, 1835	.....	
10 July, 1828	7 June, 1834	.....	
27 July, 1840	22 March, 1841	.....	
.....	.....	.....	Captured from Russia 1854.
July, 1833	13 Nov. 1834	.....	
24 June, 1842	26 Aug. 1843	.....	
26 June, 1833	2 Dec. 1834	1845 B.	
.....	.....	.....	Ditto.
12 Nov. 1829	23 April, 1834	1845 B.	
Oct. 1827	19 April, 1828	.....	
12 Oct. 1829	9 May, 1834	.....	
.....	Bought in 1855	.....	
22 May, 1818	24 Oct. 1818	1844 T.	
26 Nov. 1839	30 Sept. 1840	.....	
1852	Bought in 1855	.....	
.....	.....	.....	

MEN-OF-WAR (STEAM)

Name of vessel.	Rate.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
					SCREW LINE-OF-
Le Castiglione	2nd.	800	90	Wood	Toulon
L'Intrepide	2nd.	900	90	Ditto	Rochefort
Le Massena	2nd.	800	90	Ditto	Toulon
La Ville de Bordeaux	2nd.	900	90	Ditto	Lorient
					SCREW FRIGATES
L'Ardente	1st.	800	58	Wood	Brest
La Ville de Lyon	2nd.	900	36	Ditto	Ditto
La Gloire	2nd.	900	36	Ditto	Toulon
L'Invincible	2nd.	900	36	Ditto	Ditto
La Normandie	2nd.	900	36	Ditto	Ditto
					SCREW CORVETTES
Le Cosmao	1st.	400	...	Wood	Lorient
Le Dupleix	1st.	400	...	Ditto	Cherbourg
					SCREW AVISOS
Le Cassard	1st.	250	...	Wood	Havre
Le Forfait	1st.	250	...	Ditto	Ditto
Le Latouche Treville	2nd.	150	...	Ditto	Toulon
Le Destaing	2nd.	150	...	Ditto	Ditto
Le d'Entrecasteaux...	2nd.	150	...	Both	Rochefort
Le Pregent	2nd.	150	...	Ditto	Bordeaux
Le Renaudin	2nd.	150	...	Ditto	Ditto
Le Surcouf	2nd.	150	...	Ditto	Rochefort
					FRIGATES WITH
La Semiramis	1st.	250	...	Ditto	Rochefort
L'Amazone	2nd.	250	...	Ditto	Brest
La Ceres	3rd.	250	...	Ditto	Lorient

ON THE STOCKS.

Engines where or by whom constructed.	Keel when laid down.	Observations.
BATTLE SHIPS (FAST).		
Indret	Oct. 1835	
Rochefort ...	2 Sept. 1853	
Indret	Sept. 1835	
Ditto	26 June, 1854.....	
(FAST).		
Creuzot	6 June, 1854	
Indret	30 March, 1855 ...	Iron plated.
.....	1858.....	Ditto.
.....	1858.....	Ditto.
.....	1858.....	Ditto.
(FAST).		
.....	26 Nov. 1856	Two more of this class are ordered.
.....	10 Oct. 1856	
(FAST).		
M. Mazeline..	Dec. 1856	
Ditto	Ditto	
.....	1858.....	
.....	1858.....	
M. Nillus.....	Sept. 1856	
M. Mazeline..	June, 1856	
Ditto	Ditto	
Ditto	Sept. 1856	
AUXILIARY SCREWS.		
Rochefort ...	6 July, 1829	
M. Mazeline..	2 Jan. 1845.....	Ordered to be completed as quickly as possible, March, 1859, at Brest.
Lorient	27 Jan. 1847	

Name of vessel.	Tons.	Horse power.	Guns.	Whether wood or iron.	Hull where built.
TRANSPORTS WITH AUXILIARY					
L'Aube	1200	250	4	Wood	Rochefort
Le Finistere	1200	250	4	Ditto	Rochefort
La Garonne	1200	250	4	Ditto	Brest
Le Jura	1200	250	4	Ditto	Lorient
Le Rhone	1200	250	4	Ditto	Brest
La Mayenne	900	120	4	Iron	Nantes
La Sevre	900	120	4	Ditto	Ditto

SAILING VESSELS

Name of vessel.	Rate.	Guns.	Whether wood or iron.	Hull where built.
FRIGATES.				
La Guerriere	1st.	56	Wood	Brest
La Pallas	1st.	56	Ditto	Lorient
La Victoire	1st.	56	Ditto	Ditto
L'Astree	2nd.	46	Ditto	Ditto
La Circe	2nd.	46	Ditto	Rochefort
La Flore	2nd.	46	Ditto	Ditto
L'Hermione	2nd.	46	Ditto	Brest
La Junon	2nd.	46	Ditto	Ditto
La Magicienne	2nd.	46	Ditto	Toulon
La Themis	2nd.	46	Ditto	Ditto
L'Armorique	3rd.	42	Ditto	Lorient
La Resolue	3rd.	42	Ditto	Cherbourg
CORVETTES.				
La Cordeliere	1st.	22	Wood	Lorient
La Cornelie	1st.	22	Ditto	Toulon
La Favorite	1st.	22	Ditto	Rochefort
BRIGS.				
La Chevert	1st.	12	Wood	Rochefort
L'Euryale	1st.	12	Ditto	Ditto

Engines where or by whom constructed.	Keel when laid down.	Observations.
SCREWS (ON THE STOCKS).		
Creuzot	15 April, 1856 ...	Besides these there are 20 transports ordered, each capable of carrying 2500 men, 150 horses, and 1200 tons of stores.
Ditto	30 May, 1856.....	Fitting out April, 1859.
Ditto	2 May, 1836.....	
Ditto	21 April, 1856 ...	
Ditto	2 May, 1836.....	
Indret	June, 1855	
Ditto	Ditto	

(ON THE STOCKS).

Keel when laid down.	Observations.
8 June, 1848	
5 June, 1848	
26 June, 1830	
26 July, 1845.....	
April, 1847.....	
26 July, 1847.....	
10 May, 1847.....	
17 April, 1847	
July, 1845	
April, 1847.....	
19 April, 1850	
22 Oct. 1846	
26 April, 1850	
September, 1849	
30 July, 1849.....	
April, 1850.....	
31 Oct. 1849	

CLASSIFIED SUMMARY

OF

THE FRENCH NAVY

TO

APRIL, 1859,

INCLUDING VESSELS BUILDING, CONVERTING, OR ORDERED TO BE BUILT.

Sail and Steam.	Description of vessel.	Sailing vessels.		Steamers.		
		No.	Guns	No.	Guns	Horse power.
51	SHIPS OF THE LINE { 130–114 guns...	1	114	6	700	3740
	90 „ ...	3	270	20	1800	15250
	82–70 „ ...	10	756	11	880	5450
		14*		37†		
97 {	FRIGATES (screw) ... 58–34 „ ...	40	916	38	932	13950
	Ditto (iron-plated), 36 „ ...	...	...	4	144	3600
	Ditto (paddle) ..... 20–8 „ ...	...	...	19	284	7930
38	CORVETTES ..... 26–4 „ ...	18	352	20	175	6780
102	BRIGS AND AVISOS	35	364	67	234	11185
55	SCHOONERS, CUTTERS, ETC.	47	92	...	...	...
8	SCREW GUN-VESSELS	...	...	8	25	200
5	FLOATING BATTERIES	...	...	8	80	1125
73	TRANSPORTS (incl. 20 screw; ordered)	26	58	47	184	6570
20	SCREW GUNBOATS	...	...	20	62	2040
449	TOTAL	180	2922	265	5500	77820

Total, 449 vessels, carrying 8,422 guns, with an aggregate power of 77,820 horses.

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* Three of these are now in process of conversion.
† Thirty of these are complete, 3 receiving their engines, and 4 building.

ALPHABETICAL INDEX

TO THE

LIST OF SHIPS COMPOSING THE FRENCH NAVY.

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L'Adour	66	Le Bayard	62	Le Christophe-Colomb	68
L'Africaine	74	La Bayonnaise	76	La Circé	86
L'Agile	78	Le Beaumanoir	76	La Cleopâtre	74
L'Aigle	60	La Belle-Poule	74	La Clorinde	64
L'Aigrette	64	La Bellone	64	Le Cocyte	70
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L'Akba	72	Le Berthollet	68	Le Coligny	68
L'Alarme	64	La Biche	64	La Congrève	64
L'Albatros	68	Le Bisson	72	La Constantine	76
L'Alceste	74	Le Blavet	80	La Constitution	74
L'Alcibiade	76	Le Boberach	80	La Cordelière	86
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L'Alexandre	84	La Bourrasque	66	La Cornélie	86
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L'Antilope	72	Le Caméléon	70	Le Darien	68
L'Arcole	60	Le Canada	68	Le d'Assas	60
L'Ardent	70	Le Capelan	80	Le Dauphin	70
L'Ardente	84	La Capricieuse	76	La Décidée	78
L'Argus	78	La Caravane	80	Le d'Entrecasteaux	84
L'Ariége	66	Le Cassard	84	Le Descartes	68
L'Ariel	62	Le Cassini	70	La Dévastation	64
L'Armide	80	Le Castiglione	84	Le Dialmath	72
L'Armorique	86	Le Catinat	68	La Didon	74
L'Arquebuse	66	Le Caton	60	Le Donawerth	62
L'Artémise	76	Le Cerbère	70	La Dordogne	66
L'Asmodée	68	La Cérès	84	La Dragonne	64
L'Astrée	86	Le Cerf	78	La Dryade	64
L'Aube	86	Le Chacal	72	Le Duchayla	60
L'Audacieuse	60	Le Chamois	72	Le Ducouëdic	76
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La Flore	86
Le Fontenoy	62
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Le Forfait	84
La Forte	74
La Fortune	80
La Foudre	60
La Foudroyante	64
La Fournaise	80
Le Friedland	62
La Fulminante	66
Le Fulton	70
La Fusée	66
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La Garonne	86
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La Gironde	66
La Gloire	84
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Le Gomer	68
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RUSSIAN NAVY.

SAILING VESSELS.		STEAMERS.	
12	Ships of the line.	7	Screw ships of the line.
7	Frigates.	11	Screw frigates.
7	Corvettes.	12	Screw corvettes.
7	Brigs.	1	Screw lugger.
11	Schooners.	41	Vessels of various kinds.
7	Xebecs.	1	Tender.
5	Luggers.	—	
3	Clippers.	73	
4	Yachts.		
15	Transports.		
7	Barques.		
—			
85			

Grand total, 158. In addition to the above, the Russians have a considerable number of row gun-boats and screw gun-vessels.

SWEDISH NAVY.

SHIPS OF THE LINE.

2 Screw steamers (300 to 350 horse power), 80 to 62 guns.
5 Sailing, 80 to 62 guns.
1 Building, 80 to 62 guns.

FRIGATES.

1 Screw steam, building (400 horse power), 60 to 22 guns.
5 Sailing, 60 to 32 guns.

CORVETTES.

3 Steam (300 to 200 horse power).
5 Sailing, 24 to 18 guns.
1 Gun brig.
7 Schooners and instruction brigs.

GUN-BOATS.

2 Screw steam.
6 Screw steam, building.
13 Sailing schooners, rigged.
76 Large class (to row).
122 Smaller class (to row).
8 Mortar vessels.
3 Armed steam vessels (140 to 60 horse power).
5 Unarmed steam vessels.
25 Small sailing vessels.
21 Transports.

IN COMMISSION.

HOME STATION.

2 Steam corvettes.
2 Sailing corvettes.
1 Sailing corvette for instruction of naval cadets.
2 Brigs.
1 Brig for instruction of ships' boys.
3 Schooners.
1 Mortar vessel.
1 Screw steam gunboat.
16 Row gunboats, of different classes.
2 Armed steam vessels.
3 Unarmed steam vessels.

FOREIGN STATION.

2 Sailing corvettes.

NORWEGIAN NAVY.

FRIGATES.

		Horse power.	Guns.
1	Steam (building)	500 ...	52
1	Ditto	150 ...	41
1	Sailing	— ...	44
1	Ditto	— ...	40

CORVETTES.

1	Steam...	225 ...	14
1	Ditto	80 ...	20
1	Ditto	200 ...	6
1	Sailing	— ...	16
1	Ditto	— ...	10

BRIG.

1	Sailing	— ...	4

SCHOONERS.

1	Steam...	20 ...	6
1	Sailing	— ...	6
2	Ditto	— ...	5
2	Ditto	— ...	2

STEAMERS.

1	... ...	120 ...	2
1	(for towing gun-boats)	80 ...	2
2	Ditto	80 ...	—

STEAM GUN-BOATS.

2	... ...	60 ...	2

ROW GUN-BOATS.

78	... ...	— ...	2*
43	... ...	— ...	1*

* On shore under sheds ready for launching.

DANISH NAVY.

(*Corrected to April*, 1859.)

SAILING SHIPS OF THE LINE.

	Guns.			Built.
SKJOLD (now fitting with a screw-propeller)	84	...	...	1833.
FREDERIK DEN SJETTE	84	...	...	1831.
WALDEMAR	84	...	...	1828.
DANNEBROG	72	...	...	1850.

SAILING FRIGATES.

DRONNING MARIE (rasé)	60	...	...	1824.
THETIS	48	...	...	1840.
BELLONA	46	...	...	1830.
HAVFRUEN	46	...	...	1825.
ROTA	46	...	...	1822.
TORDENSKJOLD	44	...	...	1852.

SCREW FRIGATES.

NIELS ZUEL (300 horse-power)	42	30-pounders.		1855.
SJAELLAND (300 horse-power)	42	30-pounders.		1858.
JYLLAND (400 horse-power)	44	30-pounders.	(Building.)	

CORVETTES.

GALATHEA	26	...	...	1831.
BALKYRIEN	20	...	...	1846.
NAJADEN	14	...	...	1853.
SAGA	12	...	...	1848.

SCREW CORVETTES.

HEIMDAL (260 horse-power)	16	30-pounders.		1856.
THOR (260 horse-power)	12	30-pounders.		1851.
——— (300 horse-power)	16	...	...	(Building.)

BRIGS.

ORNEN	16	...	...	1842.
ST. THOMAS	16	...	...	1827.
MERCURIUS	12	...	...	1837.
ST. CROIX	12	...	...	1835.

SCHOONERS.

DELPHINEN	1	4 swivels.	...	1827.
PILEN	1	4 swivels.	...	1832.

FALKEN (screw yacht, 24 horse-power).

CUTTER.

NEPTUNE (Royal yacht)		6 swivels.	...	1840.

SCREW GUN-BOATS.

STOREN	2 mortars, 1 howitzer.
SCREW GUN-BOAT, No. 1.	
" No. 2. (Building.)	

PADDLE STEAM-SHIPS.

	Horse-power.	Guns.	Built.
HOLGER DANSKE ...	260	... 1 60-pounder shell gun, 6 30-pounders	1850.
SLESVIG JERNSKIB ...	240	... 12 8-pounders ...	1845.
HEKLA	200	... 1 60-pounder shell-gun, 6 24-pounders	1842.
GEISER	160	... 2 60-pounders, 6 18-pounders	1844.
SKIRNER	120	... 2 24-pounders ...	1847.
ÆGIR JERNSKIB ...	80	... 2 18-pounders, 2 18-pounders; 8 swivels	1841.
UFFO	120		
HERTHA	90		

GUN-FLOTILLA.

3 Mortar-vessels.

TRANSPORT SERVICE.

5 New transport-ships.
15 Older ditto.

SUMMARY.

SAILING VESSELS.

No.		Aggregate number of guns.
4	Ships of the line ... 3 of 84 guns	252
	1 of 72 guns	72
6	Frigates ... ... 1 (rasée)	60
	1	48
	3 of 46 guns	138
	1	44

STEAM VESSELS.

3	Screw frigates	128
4	Corvettes	74
3	Screw ditto	44
4	Brigs	56
2	Schooners	2
67	Gunboats (4 screw)	
20	Transports	
6	Paddle-steamers	40
1	Cutter	
Total 120		958

UNITED STATES NAVY.

JANUARY, 1859.

Name.	Guns.	Where & when built.	Present state.	Where stationed.
SHIPS OF THE LINE (10). (SAILING.)				
PENNSYLVANIA ...	120	Philadelphia, 1837	...	Receiving ship, Norfolk.
COLUMBUS	80	Washington, 1819	In ordinary	Norfolk.
OHIO	84	New York, 1820	.....	Receiving ship, Boston.
NORTH CAROLINA	84	Philadelphia, 1820	.....	Receiving ship, New York.
DELAWARE.....	84	Norfolk, Va. 1820	In ordinary	Norfolk.
ALABAMA	84	.....	On the stocks	Portsmouth, N.H.
VIRGINIA	84	.....	Ditto	Boston.
VERMONT	84	Boston, 1848	In ordinary	Ditto.
NEW YORK.....	84	.....	On the stocks	Norfolk.
NEW ORLEANS ...	84	.....	Ditto	Sackett's Harbour.
FRIGATES (11). (SAILING.)				
INDEPENDENCE ...	56	Boston, 1814	.....	Receiving ship, S. Francisco.
UNITED STATES...	50	Philadelphia, 1797	In ordinary	Norfolk.
CONSTITUTION ...	50	Boston, 1797	Ditto	Portsmouth, N.H.
POTOMAC	50	Washington, 1821	Ditto	New York.
BRANDYWINE.....	50	Ditto, 1825	Ditto	Ditto.
COLUMBIA	50	Ditto, 1836	Ditto	Norfolk.
CONGRESS	50	Portsmouth, 1841	Ditto	Philadelphia.
RARITAN	50	Philadelphia, 1843	Ditto	New York.
SAUTEE	50	Portsmouth, 1855	Ditto	Portsmouth, N.H.
SABINE	50	New York, 1855	.....	Coast of Brazil.
ST. LAWRENCE ...	50	Norfolk, 1847	.....	Ditto.
SLOOPS OF WAR (21). (SAILING.)				
CUMBERLAND.....	24	Boston, 1842	.....	Coast of Africa.
SAVANNAH.....	24	New York, 1842	.....	Home squadron.
CONSTELLATION ..	22	Rebuilt, Norfolk, 1854	In ordinary	Boston.
MACEDONIAN.....	22	Ditto, 1836	.....	Mediterranean.
PORTSMOUTH	22	Portsmouth, 1843	In ordinary	Portsmouth, N.H.
PLYMOUTH	22	Boston, 1843	.....	Naval Ordnance ship.

Name.	Guns.	Where & when built.	Present state.	Where stationed.
SLOOPS OF WAR—*continued.* (SAILING.)				
St. Mary's	22	Washington, 1844	.....	Pacific Ocean.
Jamestown	22	Norfolk, 1844	.....	Home Squadron.
Germantown	22	Philadelphia, 1846	.....	East Indies.
Saratoga	20	Portsmouth, 1842	.....	Home Squadron.
John Adams	20	Rebuilt, Norfolk, 1831	In ordinary	Norfolk.
Vincennes	20	New York, 1826	.....	Coast of Africa.
Falmouth	20	Boston, 1827	.....	Brazil Station.
Vandalia	20	Philadelphia, 1828	.....	Pacific Ocean.
St. Louis	20	Washington, 1828	In ordinary	New York.
Cyane	20	Boston, 1837	.....	Pacific Ocean.
Levant	20	New York, 1837	In ordinary	Boston.
Decatur	16	Ditto, 1839	.....	Pacific Ocean.
Marion	16	Boston, 1839	.....	Coast of Africa.
Dale	16	Philadelphia, 1839	.....	Ditto.
Preble	16	Portsmouth, 1839	.....	Paraguay Expedition.
BRIGS (3). (SAILING.)				
Bainbridge	6	Boston, 1842	.....	Paraguay Expedition.
Perry	6	Norfolk, 1843	.....	Ditto.
Dolphin	4	New York, 1836	.....	Ditto.
SCHOONER. (SAILING.)				
Fenimore Cooper	3	Purchased, 1852	.....	Surveying.
SCREW STEAMERS, FIRST CLASS (7).				
Franklin	50	.....	Rebuilding	Portsmouth, N.H.
Merrimac*	40	Boston, 1855	.....	Pacific Ocean.
Wabash*	40	Philadelphia, 1855	.....	Mediterranean.
Minnesota*	40	Washington, 1855	.....	East Indies.
Roanoke*	40	Norfolk, 1855	.....	Home Squadron.
Colorado*	40	Ditto, 1856	In ordinary	Boston.
Niagara*	40	New York, 1856	.....	Special service, Coast of Africa.
SCREW, SECOND CLASS (6).				
San Jacinto	13	New York, 1850	In ordinary	New York.
Lancaster	...	Building, Philadelphia.	.....	.....

* The six frigates denoted by an asterisk are stated in the official list to mount 40 guns; it is well known, however, that their real armament consists of 12 heavy Dahlgren guns.

Name.	Guns.	Where & when built.	Present state.	Where stationed.
SCREW, SECOND CLASS—*continued.*				
PENSACOLA	...	Building, Pensacola	.....	.....
BROOKLYN	...	Building, New York	.....	.....
HARTFORD	...	Boston, 1858	.....	Boston.
RICHMOND	...	Building, Norfolk	.....	.....
SCREW, THIRD CLASS (2).				
MASSACHUSETTS..	9	Transferred from W. D.	In ordinary	San Francisco.
PRINCETON.....	10	Rebuilt, Norfolk, 1851	Receivingship	Philadelphia.
PADDLE-WHEEL, FIRST CLASS (3).				
MISSISSIPPI	10	Philadelphia, 1841	.....	East Indies.
SUSQUEHANNA ...	15	Ditto, 1850	In ordinary	New York.
POWHATAN	9	Norfolk, 1850	.....	East Indies.
PADDLE-WHEEL, SECOND CLASS (1).				
SARANAC	6	Portsmouth, 1848	.....	Pacific.
PADDLE-WHEEL, THIRD CLASS (5).				
MICHIGAN	1	Erie, Pa. 1844	.....	Northern Lakes
FULTON	5	New York, 1837	.....	Paraguay Expedition.
ALLEGHANY	10	Pittsburg, Pa, 1847	.....	Receiving ship, Baltimore.
WATER WITCH...	2	Washington, 1845	.....	Paraguay Expedition.
JOHN HANCOCK...	2	Boston, 1850	In ordinary	Mare Island, Cal.
STEAM TENDERS (2).				
DESPATCH	...	Purchased, 1855	.....	Home Squadron.
ARCTIC	...	Ditto	.....	Special service.
STORE-SHIPS (5).				
RELIEF	6	Philadelphia, 1836	.....	Home Squadron.
SUPPLY	4	Purchased, 1846	.....	Paraguay Expedition.
WARREN.....	...	Boston, 1826	In ordinary	San Francisco.
FREDONIA	4	Purchased, 1846	.....	ValparaisoChili.
RELEASE.....	2	Ditto, 1855	.....	Paraguay Expedition.

DUTCH NAVY.

		Guns.
2	Ships of the line, each of	84
3	Ditto	74
7	First class frigates (3 of them screws) ...	54–45
8	Second class frigates	38–36
1	Ditto, rasée	28
10	Corvettes (5 of them screws)	19–12
7	Brigs	18–12
13	Schooners	10–4
10	Ditto, screw	8
14	Of various kinds, presenting together	94
2	Transports...	—
2	Frigates } Guard vessels	
1	Corvette }	
2	Ditto, training vessels	11
1	Brig, coast guard ...	
55	Gunboats	174
2	Screw ditto	4
1	Schooner, gun vessel	8

BELGIAN NAVY.

1 Brig (LE DUC DE BRABANT), 12 shell-guns.
1 Schooner (LA LOUISE MARIE), 12 carronades.
5 Mail steamers.

SPANISH NAVY.

SAILING VESSELS.

		Guns.
2	Ships of the line, each of...	86
4	Frigates	32–42
4	Corvettes	16–30
9	Brigs	10–20
1	Brigantine...	6
10	Schooners	1
5	Luggers	1
10	Transports...	2–4
45		

STEAMERS.

		Guns.	Horse power.
3	Frigates ...	37–50	... 360
5	Schooners ...	2–80	... 130
8	Screw steamers.		
3	Frigates ...	16	... 500
8	Brigs	6	... 350
18	Schooners ...	2–5	100–300
29	Paddle steamers.		
37			

Altogether 82 vessels, carrying 887 guns, and with engines of the aggregate power of 8160 horses.

Besides the above, there are building:

2 Steam frigates, 37 guns, 360 horse power.
2 Schooners, 200 horse power.
4 Ditto, 80 horse power.

COAST GUARD.

24 Feluccas. 87 Estamparias.

NAVY OF THE TWO SICILIES.

(*June*, 1858.)

SAILING VESSELS.

		Aggregate No. of guns.
2	Ships of the line, 1 of 90, 1 of 80 guns	170
5	Frigates, 2 of 64, 1 of 48, and 2 of 41 guns	264
2	Corvettes, 1 of 22 guns, 1 mortar vessel of 14 guns ...	36
5	Brigantines of 20 guns	100
2	Schooners of 14 guns...	28
		598

STEAMERS.

2	Frigates, 450=900 horse power	24
12	Ditto, 300=3600 horse power	72
4	Corvettes, 240=960 horse power	24
4	Smaller vessels, 200=800 horse power	16
1	Ditto, 120 horse power	4
6	Ditto, 50–40=270 horse power	24
3	Transports	0
10	Mortar vessels	10
10	Gunboats, each carrying 2 guns	20
30	Ditto, armed with Paixhan's guns...	40
Total 98 vessels,	with an aggregate of 6650 horse power, and carrying	832

Since this list was prepared, however, the number of smaller vessels has been increased, bringing the total to 121, up to June, 1858.

AUSTRIAN NAVY.

	Description.	Horse power.	Guns.	Men.
1	Screw ship of the line	800	91	900
3	Ditto frigates	300	93	1125
4	Sailing ditto	—	171	1618
2	Screw corvettes	230	44	520
5	Sailing ditto	—	82	757
5	Brigs	—	72	527
3	Steamers	300–350	18	423
10	Smaller ditto	40–180	35	608
3	Screw schooners	50–90	14	67
4	Brigantines (transports)	—	26	220
12	Gun sloops	—	40	92
12	Pinnaces	—	36	324
4	Row gunboats	—	8	312
11	Ditto yawls	—	11	160
2	Pontoons	—	20	330
1	Prahm—1 Mortar boat	—	12	120
43	Piroques for lagunes	—	43	90
7	Transports	—	0	430
135			852	8707

PORTUGUESE NAVY.

		Guns.
1	Ship of the line	80
1	Frigate	50
3	Corvettes of 18 guns	54
2	Brigs of 18 guns	36
3	Ditto of 16 guns	48
1	Ditto	14
11	Schooners, &c.	45
9	Transports	9
6	Steamers	26
37		362

2 On the stocks.

SUMMARY.

	Commissioned.	Dismantled.	Building.	Total.	Guns.	Men.
Sailing vessels	27	4	2	33	356	1941
Steamers	5	1	0	6	6	240
	32	5	2	39	362	2181

SARDINIAN NAVY.

6 Steam frigates.
4 Sailing ditto.
3 Steam corvettes.
4 Sailing ditto.
3 Steam avisos, or despatch vessels.
4 Brigantines.
3 Steam transports.
1 Tug.

Altogether 29 vessels and 436 guns.

PRUSSIAN NAVY.

		Guns.
2	Sailing frigates (GEFION and THETIS)	86
2	Steam ditto (DANZIG and BARBAROSSA)	21
1	Screw corvette (ANCONA) building	28
1	Paddle ditto (GAZELLE) ditto	28
1	Sailing ditto (AMAZON)...	12
1	Steam yacht (GRILLON)	0
1	Transport (MERCURY)	6
3	Schooners (HELA, FRAUENLOB, and ILTIS)	6
1	Steamer (ROYAL VICTORIA)	0
36	Gunboats, 2 guns each	72
6	Ditto, yawls	6
55	Vessels of all kinds, carrying	265

GREEK NAVY.

		Guns.
2	Corvettes; 1 of 26, and 1 of 22 guns	48
1	Steam corvette	6
3	Brigs; 2 of 16 guns, and 1 transport	32
8	Schooners (4 of them steamers)	38
1	Cutter	8
1	Yacht	1
2	Cutters (despatch vessels)	0
4	Gunboats	12
4	Gun vessels	4
26		149

TURKISH NAVY.

7 Line-of-battle ships.
6 Frigates.
4 Corvettes.
7 Brigs.
2 Mail packets.
23 Transports.

49

BRAZILIAN NAVY.

SAILING VESSELS.	STEAMERS.
1 Frigate.	7 Screw } 1770 horse power.
5 Corvettes.	8 Paddle }
2 Barques.	15
5 Brigs.	
7 Brigantines.	
1	
4 Schooners.	
2 Gun-boats.	
27	

This fleet, in five different divisions, is thus stationed :—

1. Rio Janeiro	...	13	sailing vessels	10	steamers.
2. Bahia	... ...	4	„	1	„
3. Pernambuco	...	3	„	1	„
4. Maranhao	...	3	„	1	„
5. Rio Plata...	...	4	„	2	„

In the province of Matto Grosso there are, besides, 29 gun-boats. In the autumn of 1858 the Government were building 3 frigates, 4 corvettes, and a steamer.

MARINES.

Commissioned and non-commissioned officers	672
Privates	2663
Total	3345

PERUVIAN NAVY.

2	Frigates...	1 of 33 guns. 1 of 46 „
2	Steamers	1 of 10 „ 1 of 1 „
1	Brigantine	14 „
4	Small steamers.	
1	Mail steamer.	
5	Pontoons.	
Total 15	vessels, carrying	104 „

1	Battalion of marines	458 men.
A	corps of pilots	428 „

CHILIAN NAVY.

		Guns.
1	Corvette	18
1	Brig	14
1	Ditto	10
1	Schooner	4
1	Steamer	20
5		66

PERSONNEL.—Two admirals, 16 captains, 14 lieutenants, 22 midshipmen. Total, 54.

MEXICAN NAVY.

This navy comprises 9 small vessels, carrying an aggregate of 35 guns. The crews amount altogether to 300 men.

TABLE (B),

Showing the Number of Ships in Commission on 1st of January, 1859, together with the Amount of their Guns and Crews.

Station.	No. of ships.	Guns.	Men.
East Indies, China, and Australia	49	389	5,051
Cape of Good Hope	8	104	1,239
West Coast of Africa	18	100	1,885
Brazils	9	146	1,672
Pacific	12	281	2,845
North America and West Indies	21	320	3,470
Mediterranean	22	532	5,786
	139	1,872	21,948
Plymouth, Portsmouth, Sheerness, Woolwich, Pembroke, Cork	45	979	7,958
Coast Guard Service	26	623	3,612
Channel Squadron	7	498	4,697
Particular Service	12	86	1,496
Surveying Service, Packet Service, Yachts, Unappropriated and Fitting out	17	133	1,733
Paying off, Ordered Home, Flag Officers and Retinue	21	458	5,265
Supernumeraries on Ships' Books, Kroomen on Coast of Africa	...	...	1,244
Marines in China	...	...	1,813
Marines on Shore in England	...	...	6,282
Total	267	4,649	56,048

	Ships.	Guns.	Men.
On the 1st of Jan., 1853, the numbers were	203	3584	41,165
Increase on the 1st of Jan., 1859	64	1065	14,883

LONDON:
SAVILL AND EDWARDS, PRINTERS,
CHANDOS STREET.

(C),

tary Estimates) *in each Year, from* 1852 *to* 1858, *both inclusive; Seamen and Marines voted.*

1853–54.	1854–55.	1855–56.	1856–57.	1857–58.	1858–59.
45,500	63,500	70,000	61,000	55,200	55,500 *3,880
£	£	£	£	£	£
1,736,236	2,654,371	2,885,567	2,601,922	2,219,415	2,401,599
615,426	1,620,324	1,374,081	1,167,338	862,198	1,027,357
137,245	143,467	140,469	138,399	134,217	140,439
50,000	50,000	50,000	20,000	198,150	178,592
34,939	51,722	51,676	58,982	63,091	60,615
134,230	133,826	142,571	153,795	152,224	151,634
22,764	22,297	26,919	36,494	25,423	27,279
683,648	1,019,148	1,112,220	1,190,309	884,390	966,921
35,566	39,259	60,500	109,913	53,383	54,671
1,023,011	2,828,492	3,991,969	3,000,500	1,395,450	1,389,742
256,948	436,443	629,071	904,334	578,415	585,862
26,000	62,000	64,100	65,500	40,000	50,000
57,427	80,653	74,086	89,972	86,722	71,470
687,575	657,575	635,497	655,421	691,603	694,148
483,134	476,659	469,222	494,563	478,163	480,061
148,394	148,798	149,558	147,685	147,682	160,481
152,950	3,574,750	6,766,268	4,977,200	297,000	410,500
835,212	812,826	755,239	756,487	965,064	988,488
7,120,705	14,812,609	19,379,013	16,568,614	9,172,590	9,839,859
.....	.....	.....	.....	100,000	
.....	.....	.....	.....	556,866	
				9,829,456	
77,099	204,982	211,820	.....	133,383	
.....	.....	.....	1,904,100	...	
7,197,804	15,017,591	19,590,833	14,664,514	9,962,839	incomplete.

on shore.

TABLE

Showing the Expenditure in the different Dockyards during

Head of Expenditure.	1848–49.	1849–50.	1850–51.	1851–52.	1852–53.
	£	£	£	£	£
Building vessels.....	388,325	416,945	401,307	375,948	309,961
Converting ditto	...	981	...	...	16,072
Making good defects and fitting for sea...	273,041	243,953	247,817	220,184	269,118
Ditto of troop-ships, yachts, &c.	80,236	71,147	102,967	35,123	81,783
Fitting ships for the steam reserve	18,566	77,664	43,269	53,618	39,760
Repairing	33,301	97,355	115,356	71,218	67,535
Maintaining in ordinary, hulks, &c.....	29,110	19,211	9,262	13,165	12,371
Taking to pieces old vessels.....	922	4,627	2,566	2,144	1,210
Incidental expenses: Navigating ships from one port to another; materials supplied to barracks, victualling yards, &c.	5,233	7,738	9,841	9,635	12,754
TOTAL	828,734	939,621	932,385	781,035	810,564
To the above may be added :—					
Expenses incurred for moorings, buoys, &c.; transporting and docking ships, cranes, capstans, &c.; repairs to yard transports, lighters, and boats; receiving, landing, and shipping stores and timber, carting, pitting, and issuing timber, &c.	206,732	209,042	188,533	180,557	186,391
Expenses incurred in foreign yards for the repairs, &c., of ships..	56,847	37,062	35,091	38,675	32,041

* Estimated valu

(D),

each of the following Years for the several Services specified.

1853–54.	1854–55.	1855–56.	1856–57.	1857–58.	1858–59.	TOTAL.
£	£	£	£	£	£	£
302,260	523,634	622,022	685,755	461,171	461,050*	4,948,378
21,514	64,632	63,859	1,131	34,008	120,921*	323,118
475,857	834,613	749,190	365,678	352,253	502,600	4,534,304
76,175	80,790	157,784	104,121	166,503	156,362	1,112,991
62,815	3,346	30,835	144,383	165,511	127,135	766,902
33,426	18,491	15,314	43,852	15,749	24,972	536,569
17,752	16,436	26,488	35,192	7,171	22,950	209,108
3,682	2,518	928	2,353	3,215	2,165	26,330
13,987	18,015	18,508	19,609	21,821	19,980	157,121
1,007,468	1,562,475	1,684,928	1,402,074	1,227,402	1,438,135	12,614,821
167,615	197,747	268,888	309,553	256,407	278,282	2,469,747
31,342	39,615	76,628	60,512	65,869	55,742	529,424

of work done.

TABLE

Showing the actual Expenditure since 1852 *on New Works,*

ENGLAND.

Head of Expenditure.	1852–53.	1853–54.
New works, improvements, and repairs in the yards, &c.	£ 240,006	£ 243,126
FRANCE.		
New works and repairs of docks, &c., and of civil buildings (including wages and materials), improvement of port vendres, &c.	146,031	185,069
Extraordinary works (Cherbourg, &c.)	99,287	138,435

*** A considerable portion of the expenditure for Cherbourg and other England would be voted

TABLE

Showing the actual Expenditure in England and France for the &c., including

ENGLAND.

Head of Expenditure.	1852–53.	1853–54.
	£	£
Wages to seamen and marines	1,402,915	1,655,049
Victuals for ditto	524,528	858,978
Royal Naval Coast Volunteers and Coast Guard	...	...
Coast Guard under Board of Customs	428,489	425,732
TOTAL	2,355,932	2,939,759
FRANCE.		
Pay of military and civil officers.....	319,015	301,264
Pay and clothing of seamen, afloat and on shore (including Marine Infantry and Artillery) ...	984,621	1,092,643
Provisions, including wages, Victualling Department	442,032	592,072
TOTAL ..... £	1,745,668	1,985,979

*** The above expenditure, in France, includes many services, such as pay convicts. In England these are provided for in other estimates; expenditure for wages and victuals voted in the English Navy

(E),

Improvements, and Repair of Docks, &c., in England and France.

1854–55.	1855–56.	1856–57.	1857–58.	Estimate, 1858–59.	Estimate, 1859–60.
£	£	£	£	£	£
363,985	560,973	891,889	555,840	585,862	.....
			Estimate.	Estimate.	Estimate.
210,555	256,719	299,288	275,430	474,869	500,000
112,782	197,545	223,891	200,000	Nil.	Nil.

ports, includes the cost of fortifications and defensive works, which in in the army estimates.

(F),

Pay, Victualling, Clothing, &c., of Officers, Seamen, Marines, Coast Guard.

1854–55.	1855–56.	1856–57.	1857–58.	Estimate, 1858–59.	Estimate, 1859–60.
£	£	£	£	£	£
2,468,849	2,639,874	2,552,053	2,288,792	2,401,599	.....
1,765,036	1,385,013	849,675	889,988	1,027,357	.....
11,976	11,565	9,090	220,421	178,592	.....
430,810	450,031	454,852	.....	.....	.....
4,676,671	4,486,483	3,865,670	3,399,201	3,607,548	.....
			Estimate.	Estimate.	Estimate.
280,000	295,950	336,107	334,279	342,419	361,995
1,580,843	1,795,584	1,503,528	1,157,047	1,149,542	1,152,657
1,472,263	1,295,536	1,397,522	561,920	521,560	477,280
3,333,176	3,387,070	3,237,157	2,053,246	2,013,521	1,991,932

and victualling of troops for Colonial service, of crews of transports, and of the corresponding services are consequently not included in the above Estimates.

TABLE (G),

Showing comparative Condition and Numbers of the Steam Navies of England and France at Commencement of 1859.

Description of vessel.	England.					France.				
	Complete.	Receiving Engines.	Converting.	Building.	Total.	Complete.	Receiving Engines.	Converting.	Building.	Total.
Line-of-battle ships (screw)	29	4	7	10	50	29	2	4	5	40
Frigates (iron-plated)	...	...	...	...	...	...	...	...	4	4
Block-ships (screw)	9	...	...	...	9	...	...	...	...	...
Frigates { screw	17	2	...	6	25	15	3	1	8	27
Frigates { paddle	9	...	...	...	9	19	...	...	...	19
Mortar-ships	4	...	...	...	4	...	...	...	...	...
Corvettes and sloops { screw	38	...	...	9	47	9	...	...	4	13
Corvettes and sloops { paddle	35	...	...	...	35	9	...	...	...	9
	141	6	7	25	179	81	5	5	21	112
Gun, despatch, and small vessels { screw	29	...	...	...	29	17	...	...	10	27
Gun, despatch, and small vessels { paddle	24	...	...	...	24	66	...	...	...	66
Floating batteries (screw)	8	...	...	...	8	5	...	...	...	5
	202	6	7	25	240	169	5	5	31	210
Gun-boats (screw)	161	...	...	1	162	28	...	...	...	28
Troop-ships and store-ships (steam)	15	...	...	...	15	22	...	...	4	26
Yachts, tenders, tugs, &c. (steam)	47	...	...	...	47	...	...	...	...	...
	425	6	7	26	464	219	5	5	35	264
Total	464					264				

THE NATIONAL DEFENCES.

THE subjoined copy of the memorable Letter upon the National Defences, addressed by the Duke of Wellington to Sir John Burgoyne, in 1847, and which appeared in the columns of the *Times* shortly after, will doubtless be deemed of sufficient importance to warrant its reproduction here:—

TO MAJOR-GENERAL SIR JOHN J. BURGOYNE, K.C.B., &c.

Strathfieldsaye, Jan. 9, 1847.

MY DEAR GENERAL,—Some days have elapsed—indeed, a fortnight has—since I received your note, with a copy of your observations on the possible results of a war with France, under our present system of military preparation.

You are aware that I have for years been sensible of the alteration produced in maritime warfare and operations, by the application of steam to the propelling of ships at sea.

This discovery immediately exposed all parts of the coasts of these islands, which a vessel could approach at all, to be approached, at all times of the tide, and in all seasons, by vessels so propelled, from all quarters. We are, in fact, assailable, and at least liable to insult, and to have contributions levied upon us on all parts of our coast; that is, the coast of these, including the Channel, Islands, which to this time, from the period of the Norman Conquest, have never been successfully invaded.

I have in vain endeavoured to awaken the attention of different Administrations to this state of things, as well known to our neighbours (rivals in power, at least former adversaries and enemies) as it is to ourselves.

I hope that your paper may be attended with more success than my representations have been.

I have above, in few words, represented our danger. We have no defence, or hope of defence, excepting in our fleet.

We hear a great deal of the spirit of the people of England, for which no man entertains a higher respect than I do. But unorganized, undisciplined, without systematic subordination established and well understood, this spirit, opposed to the fire of musketry and cannon, and to sabres and bayonets of disciplined troops, would only expose those animated by such spirit to confusion and destruction. Let any man only make the attempt to turn to some use this spirit in a case of partial local disturbance; the want of previous systematic organization and subordination will prevent him even from communicating with more than his own menial servants and dependents; and while mobs are in movement through the country the most powerful will find that he can scarcely move from his own door.

It is perfectly true that, as we stand at present, with our naval arsenals and dockyards not half garrisoned, 5000 men of all arms could not be put under arms, if required, for any service whatever, without leaving standing without relief all employed on any duty, not excepting even the guards over the palaces and the person of the Sovereign.

I calculate that a declaration of war should probably find our own garrisons of the strength as follows, particularly considering that one of the most common accusations against this country is, that the practice has been to commence reprisals at sea simultaneously with a declaration of war, the order for the first of which must have been issued before the last can have been published.

We ought to be with garrisons as follows at the moment war is declared:—

Channel Islands (besides the militia of each well organized, trained, and disciplined)	10,000 men.
Plymouth	10,000 „
Milford Haven	5,000 „
Cork	10,000 „
Portsmouth	10,000 „
Dover	10,000 „
Sheerness, Chatham, and the Thames	10,000 „

I suppose that one-half of the whole regular force of the country would be stationed in Ireland, which half would give the garrison for Cork. The remainder must be supplied from the half of the whole force at home stationed in Great Britain.

The whole force employed at home in Great Britain and Ireland would not afford a sufficient number of men for the mere defence and occupation, on the breaking out of war, of the works constructed for the defence of the dockyards and naval arsenals, without leaving a single man disposable.

The measure upon which I have earnestly entreated different Administrations to decide, which is constitutional, and has been invariably adopted in time of peace for the last 80 years, is to raise, embody, organize, and discipline the militia of the same numbers for each of the three kingdoms united as during the late war. This would give a mass of organized force amounting to about 150,000 men, which we might immediately set to work to discipline. This alone would enable us to establish the strength of our army. This, with an augmentation of the force of the regular army, which would not cost 400,000*l.*, would put the country on its legs in respect to personal force, and I would engage for its defence, old as I am.

But, as we stand now, and if it be true that the exertions of the fleet alone are not sufficient to provide for our defence, we are not safe for a week after the declaration of war.

I am accustomed to the consideration of these questions, and have examined and reconnoitred, over and over again, the whole coast from the North Foreland, by Dover, Folkestone, Beachy-head, Brighton, Arundel, to Selsey-bill, near Portsmouth; and I say that, excepting immediately under the fire of Dover Castle, there is not a spot on the coast on which infantry might not be thrown on shore, at any time of tide, with any wind and in any weather, and from which such body of infantry, so thrown on shore, would not find within the distance of five miles a road into the interior of the country through the cliffs practicable for the march of a body of troops.

That in that space of coast (that is, between the North Foreland and

Selsey-bill), there are not less than seven small harbours or mouths of rivers, each without defence, of which an enemy, having landed his infantry on the coast, might take possession, and therein land his cavalry and artillery of all calibre, and establish himself and his communication with France.

The nearest part of the coast to the metropolis is undoubtedly the coast of Sussex, from the east and west side of Beachy-head and to Selsey-bill. There are not less than 12 great roads leading from Brighton upon London, and the French army must be much altered indeed since the time at which I was better acquainted with it, if there are not now belonging to it 40 *chefs d'état Major-General* capable of sitting down and ordering the march to the coast of 40,000 men, their embarkation, with their horses and artillery, at the several French ports on the coast; their disembarkation at named points on the English coast, that of the artillery and cavalry in named ports or mouths of rivers, and the assembly at named points of the several columns; and the march of each of these from stage to stage to London.

Let any man examine our maps and road-books, consider of the matter, and judge for himself.

I know of no mode of resistance, much less of protection, from this danger, excepting by an army in the field capable of meeting and contending with its formidable enemy, aided by all the means of fortification which experience in war and science can suggest.

I shall be deemed foolhardy in engaging for the defence of the empire with an army composed of such a force of militia. I may be so. I confess it, I should infinitely prefer, and should feel more confidence in, an army of regular troops. But I know that I shall not have these. I may have the others; and if an addition is made to the existing regular army allotted for home defence of a force which will cost 400,000*l.* a year, there would be a sufficient disciplined force in the field to enable him who should command to defend the country.

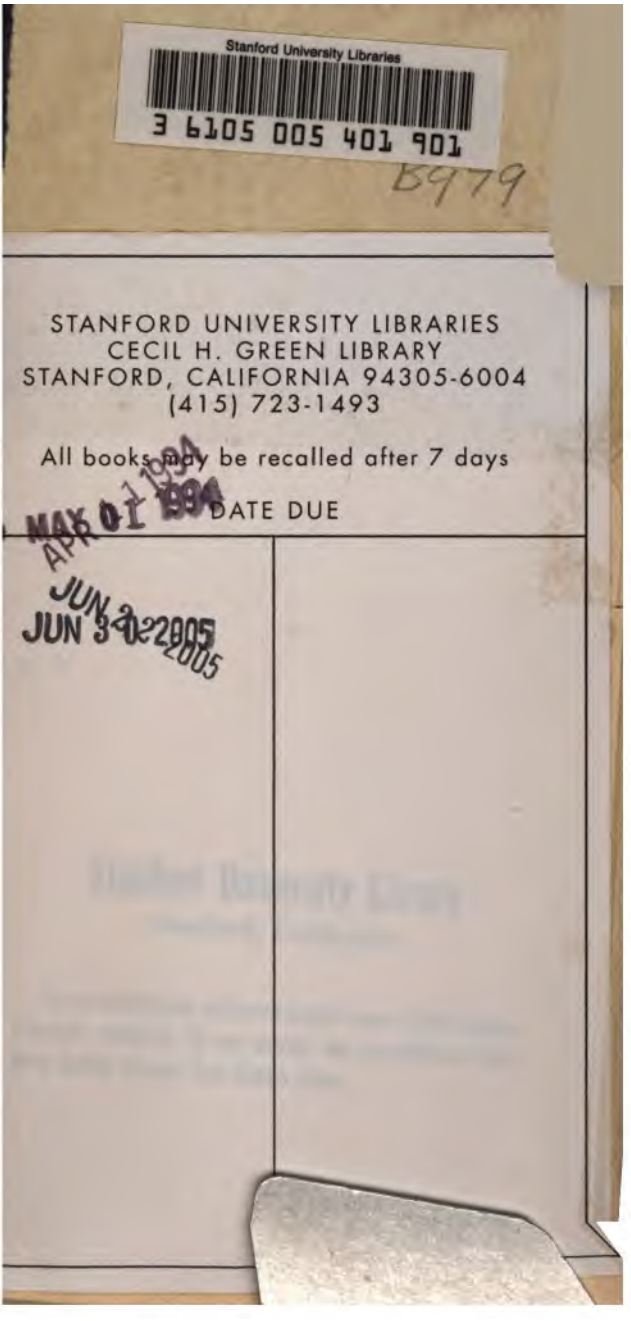
This is my view of our danger and our resources. I was aware that our magazines and arsenals were very inadequately supplied with ordnance and carriages, arms, stores of all denominations, and ammunition.

The deficiency has been occasioned in part by the sale of arms, and of various descriptions of ordnance stores, since the termination of the late war, in order to diminish the demand of supply to carry on the peace service of the ordnance, in part by the conflagration of the arsenal which occurred in the Tower some years ago, and by the difficulty under which all Governments in this country labour in prevailing upon Parliament, in time of peace, to take into consideration measures necessary for the safety of the country in time of war.

The state of the ordnance, arms, ammunition, &c., in magazines is in part the question of expense, and perhaps, in some degree, one of time.

I would recommend to have an alphabetical list of the stores examined by a committee, and made out in form, as upon the enclosed half-sheet of paper, by ascertaining what there was in 1804, and what there is in store now, of each article, and the difference between the two accounts.

I have taken the year 1804 as the standard, as that was the year in which the invasion was threatened. It was previous to the employment of the armies in the Peninsula or North America; in short, as nearly as possible similar to the political circumstances in which we stand at this moment, excepting that we are now at peace with France—we were then at war.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